Global Command and Control System - Maritime (GCCS- M)

Software Test Description (STD) for COAMPS™ and COWEB Segments Version 1.0.0.0
Document Version 1.2

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Space and Naval Warfare Systems Command (SPAWAR)

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1. Scope

1.1 Identification

This Software Test Description (STD) identifies the test requirements for the COAMPS™ and COWEB segments of the Coupled Ocean/Atmosphere Mesoscale Prediction System - On Scene (COAMPS-OS™). Completion of the testing described in the following sections will confirm the successful installation of both segments.

1.2 System Overview

COAMPS-OS™ is an on-scene weather prediction system that incorporates database and visualization components to support the Navy's Coupled Ocean/Atmosphere Mesoscale Prediction System (COAMPS™).

COAMPS-OS™ is comprised of two separate segments, COAMPS™ and COWEB. The COAMPS™ segment provides the computational, data management, and visualization components of the COAMPS-OS™ system. The COWEB segment provides the webserver component of the COAMPS-OS™ system. For further details, refer to Section 2 for additional COAMPS-OS™ system documentation.

2. References

2.1 Acknowledgements

The STD is a collaboration effort of the COAMPS-OS™ developers: Sarah Bargsten, John Cook, Linda Frost, Michael Frost, Daniel Geiszler, Daren Grant, John Kent, Gary Love, Daniel Martinez, Lari Migues McDermid, and Jennifer Strahl.

2.2 Documents

January 2002	COAMPS-OS™ Installation Procedures
January 2002	COAMPS-OS™ System Administrator's Manual
January 2002	COAMPS-OS™ User's Manual

3. Test Preparation

3.1 Installation Preparation

3.1.1 Hardware Preparation

No special preparation of the target hardware is required for testing the COAMPS™ and COWEB segments.

3.1.2 Software Preparation

Proper installation of the COAMPS™ and COWEB segments of COAMPS-OS™ is required before proceeding with the test procedures. Refer to the COAMPS-OS™ Installation Procedures for detailed instructions on installing the COAMPS™ and COWEB segments.

4. Test Description

4.1 Installation Description

4.1.1 Installation Procedure

Refer to the COAMPS-OS™ Installation Procedures document.

4.1.1.1 Prerequisite Conditions

The COAMPS™ and COWEB segments must be installed and properly configured prior to testing the COAMPS-OS™ system. In addition, a sample dataset (refer to Section 4.1.1.2) must be installed.

4.1.1.2 Test Inputs

Two datetime groups (1999083100 and 1999083112) will be delivered with COAMPS-OS™ on CD-ROM. The datasets will include Navy Operational Global Atmospheric Prediction System (NOGAPS) fields and atmospheric/oceanic observations.

Field	Levels
Air Temperature	10, 20, 30, 50, 70, 100, 150, 200, 250, 300, 400, 500, 700, 800, 850, 900, 925, 950, 975, 1000, 1013
Geopotential Height	10, 20, 30, 50, 70, 100, 150, 200, 250, 300, 400, 500, 700, 800, 850, 900, 925, 950, 975, 1000, 1013
Ground/Sea Temperature	Surface
Ground Wetness	Surface
Sea Level Pressure	Surface
Snow Depth	Surface
U-Wind Component	10, 20, 30, 50, 70, 100, 150, 200, 250, 300, 400, 500, 700, 800, 850, 900, 925, 950, 975, 1000, 1013
V-Wind Component	10, 20, 30, 50, 70, 100, 150, 200, 250, 300, 400, 500, 700, 800, 850, 900, 925, 950, 975, 1000, 1013
Water Vapor	10, 20, 30, 50, 70, 100, 150, 200, 250, 300, 400, 500, 700, 800, 850, 900, 925, 950, 975, 1000, 1013

File Prefix	Observation Type
AMD	Aircraft winds
GMSN, GMSS	Satellite water vapor winds
GMT1, GMT2	Satellite water vapor winds
GOSE, GOSW	Satellite water vapor winds
GTO	Upper-Air Tropical Bogus
MCR	Aircraft winds
PAB	Surface Reports
PIB	Pilot Balloon Optical Theodolite winds
S0A	Aircraft winds

S0X	Rawinsondes
SHX	Coastal surface land-based reports
SMX	Automated/Manual surface land-based reports
TSX	Satellite derived winds
TWX	Satellite derived winds
rtovs	NOAA revised TOVS brighness temperature and retrievals
ssmi	SSM/I wind speed, air-sea EDR
ssmt	DMSP SSM/T-1 brightness temp and retrievals
ssmt2	DMSP SSM/T-2 brightness temp and retrievals

File Extension	Observation Type
Altim	TOPEX and ERS altimeter SSHA
Mcsst	AVHRR SST retrievals
Profile	subsurface measures of in situ T and S
Ship	in situ surface measures of T
Ssmi	DMSP sea ice concentration retrievals

4.1.1.3 Test Procedure

The numbered steps in this section have two components: 1) a single sentence describing the action to be performed followed by 2) a detailed description of that action.

1.   Install the sample dataset.

Insert the CD-ROM, which contains the sample dataset, into the COAMPS-OS™ system CD-ROM drive. Install the dataset by typing: **`[path to CD-ROM]/install.sample.ksh`**.

2.   Open the COAMPS-OS™ GUI and read the Example_Lambert project. Figures 1 through 6 depict all of the steps required to open and read the Example_Lambert project. Perform the steps described in the figure captions.
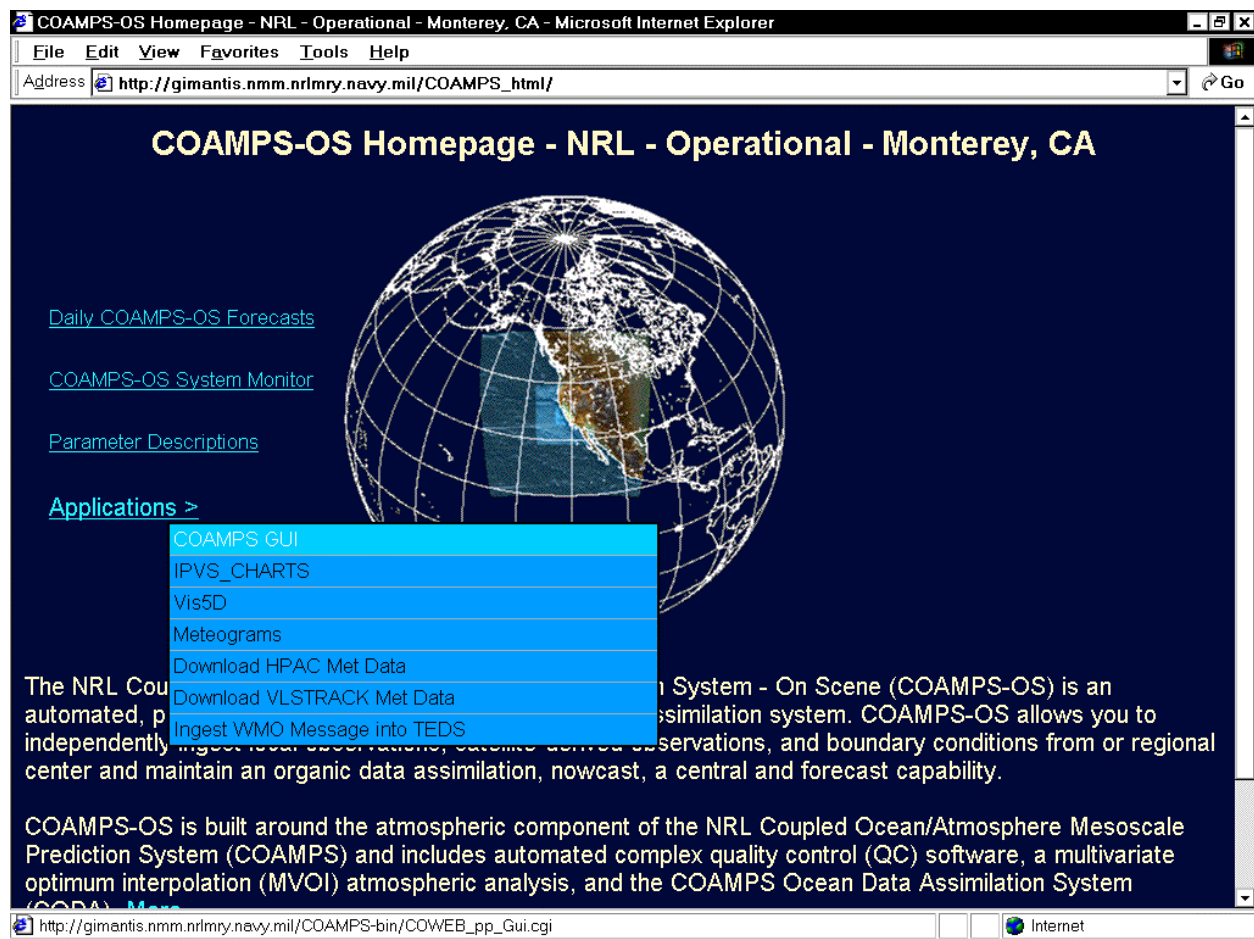
Figure 1. From the COAMPS-OS™ *Homepage***, select COAMPS™ GUI from the** *Applications* **drop-down menu.**
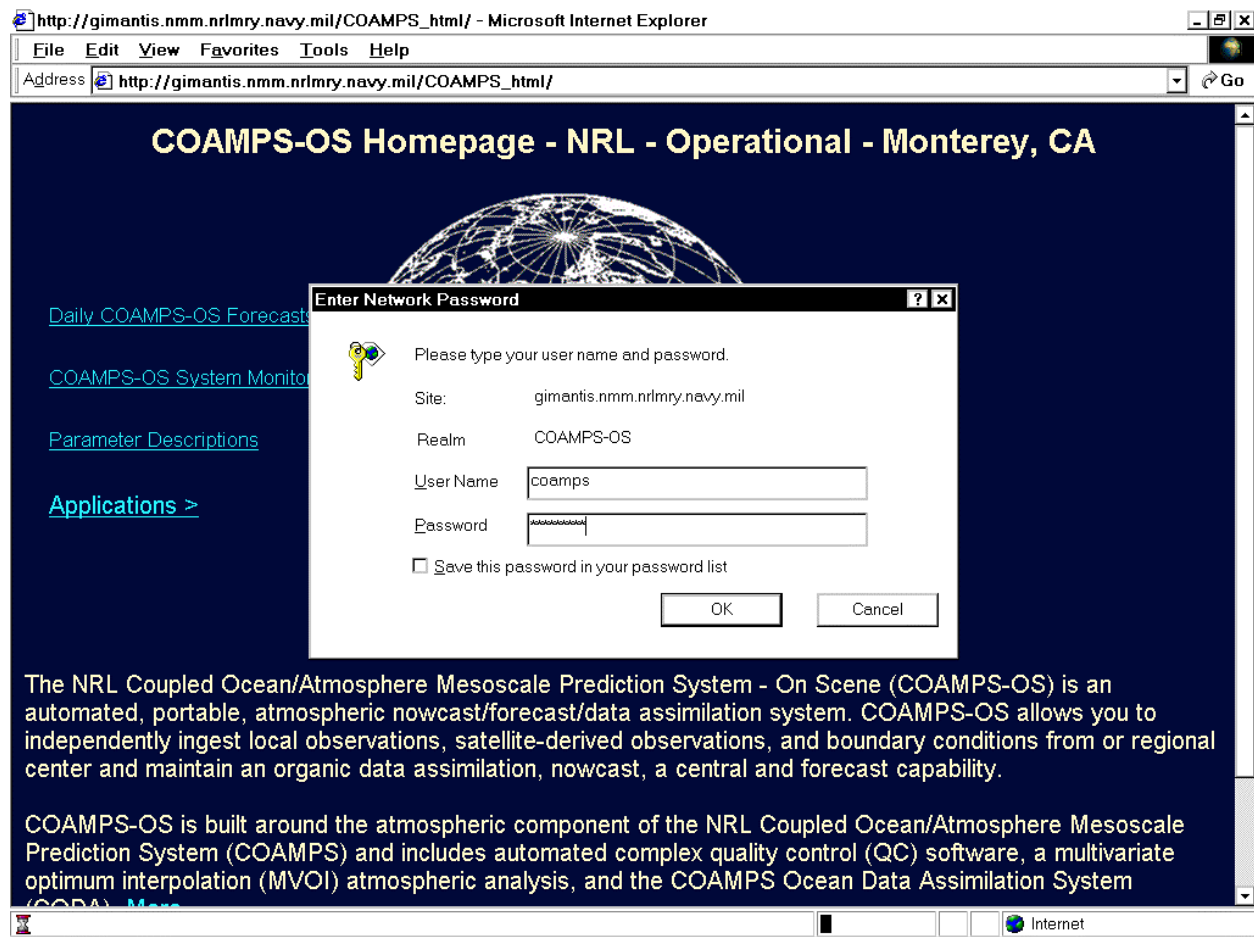
Figure 2. Enter *User Name* and *Password* to authenticate for the COAMPS™ GUI.
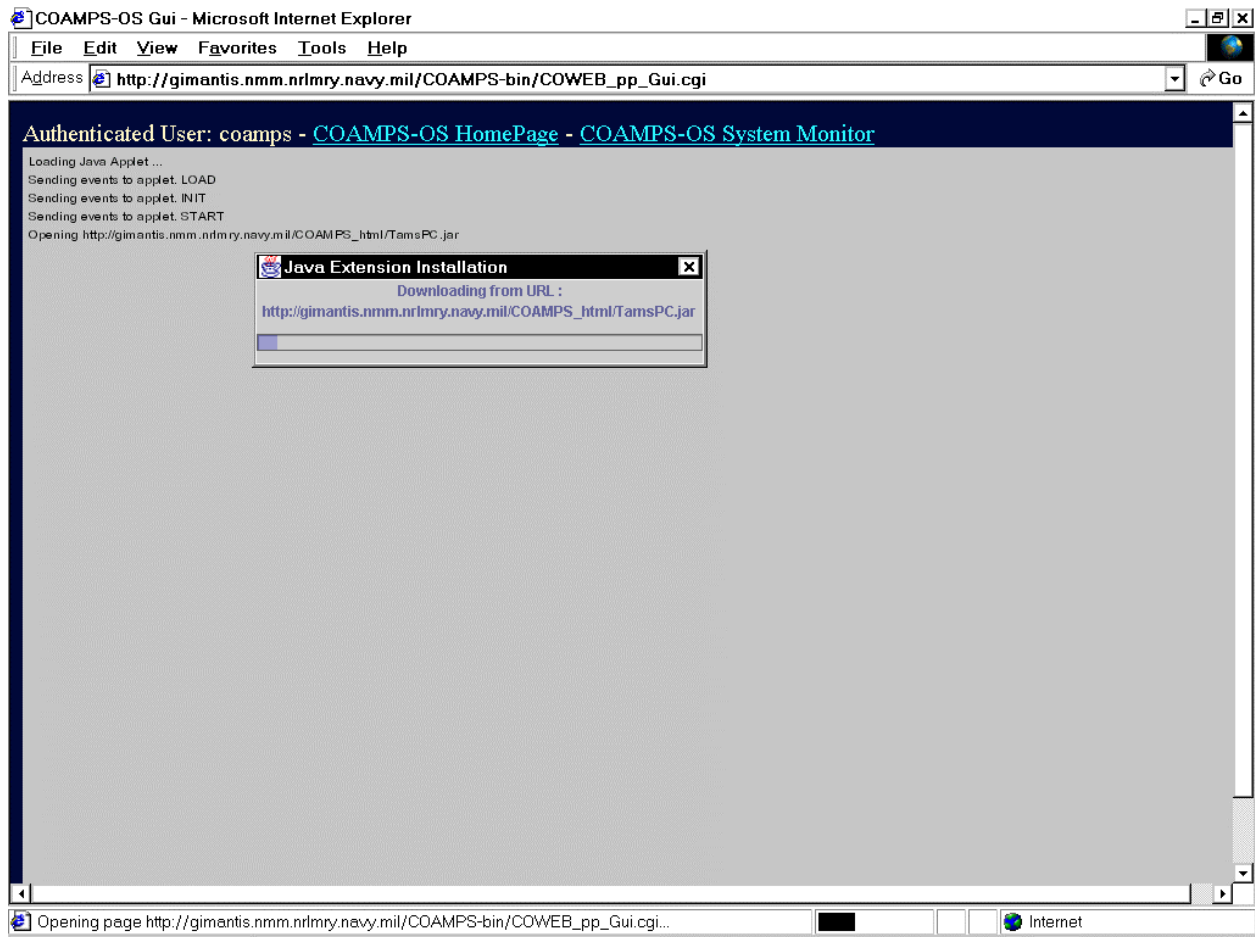
Figure 3. The COAMPS-OS™ GUI will load into the browser.
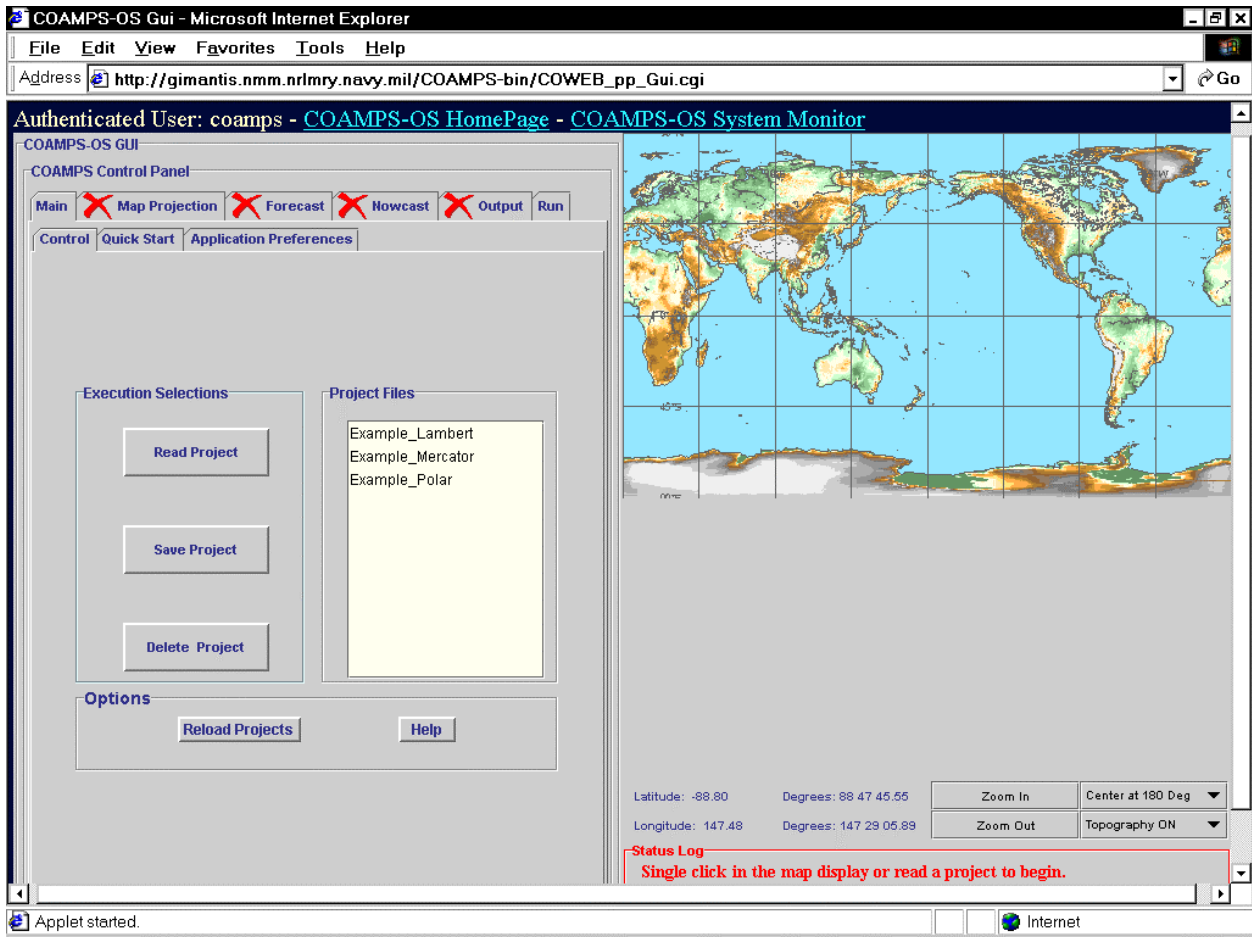
Figure 4. The initial display of the COAMPS-OS™ GUI will show a *Control Panel* on the left and a *Map Panel* on the right. If no project files are listed, click the *Reload Projects* button.
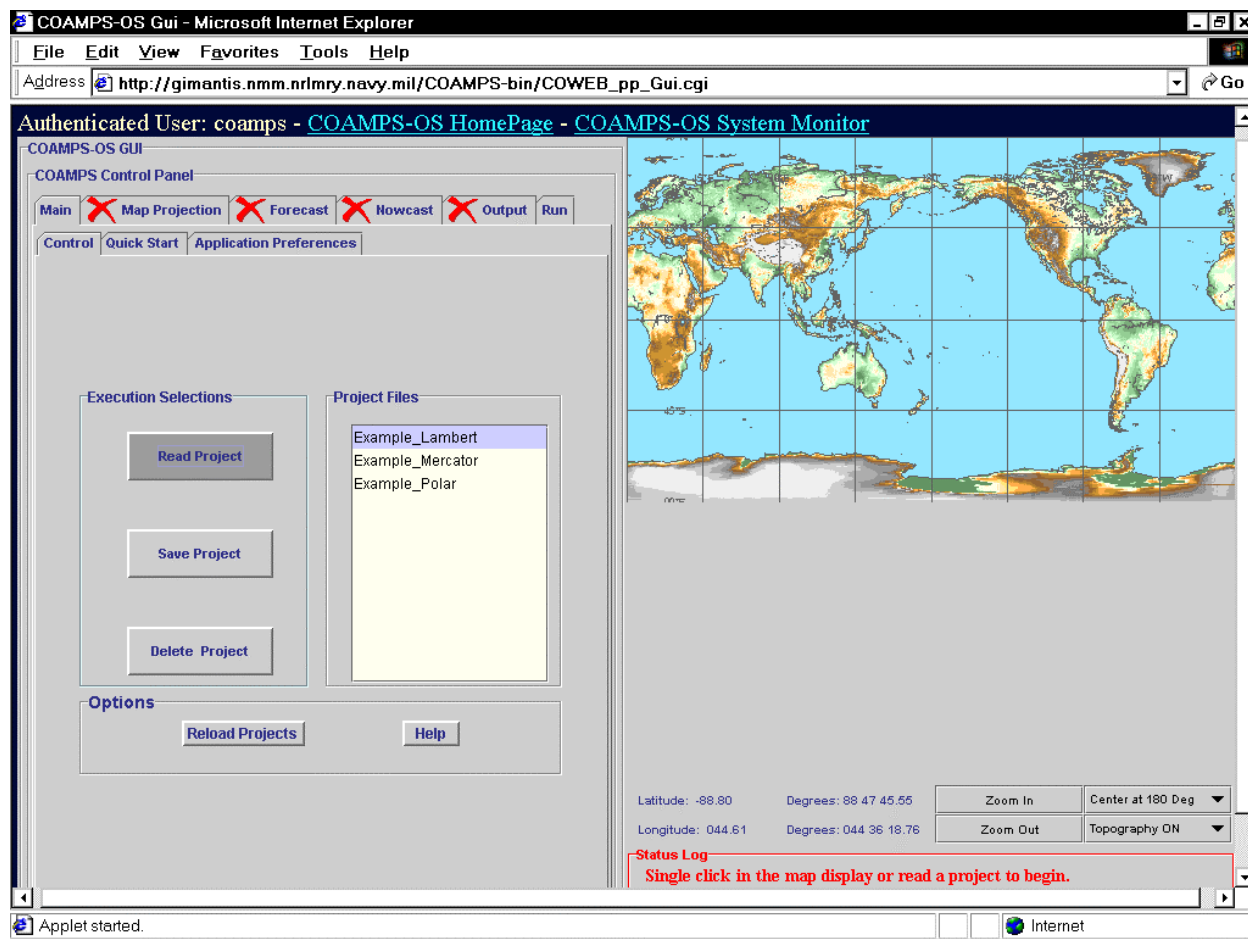
Figure 5. Highlight Example_Lambert project with a single mouse click and click the *Read Project* button on the left.
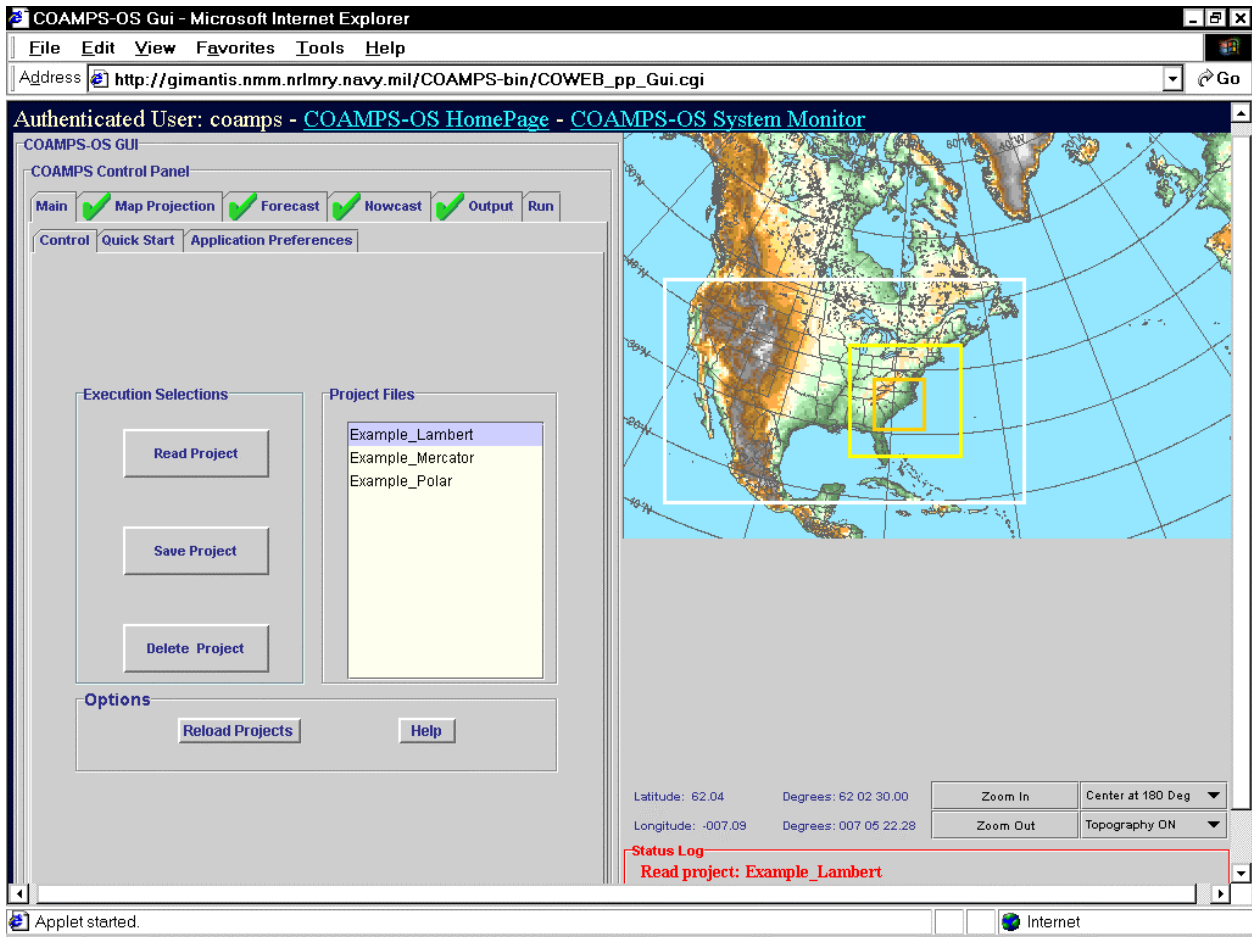
Figure 6. When the Example_Lambert project has been loaded this map will be displayed and all of the ✖ symbols in the *Control Panel* will become ✔ symbols.

3.   Click the **Run** tab in the COAMPS-OS™ GUI, shown in Figure 6. Figure 7 shows the window prompting the user to confirm the project has been saved. Click **OK** to proceed.
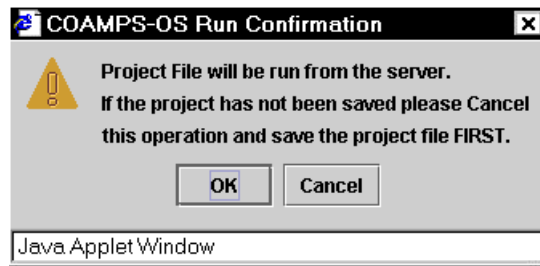
Figure 7. Confirmation window after selecting to run a COAMPS-OS™ project.

4.   Run the 1999083100 datetime group highlighted in Figure 8.
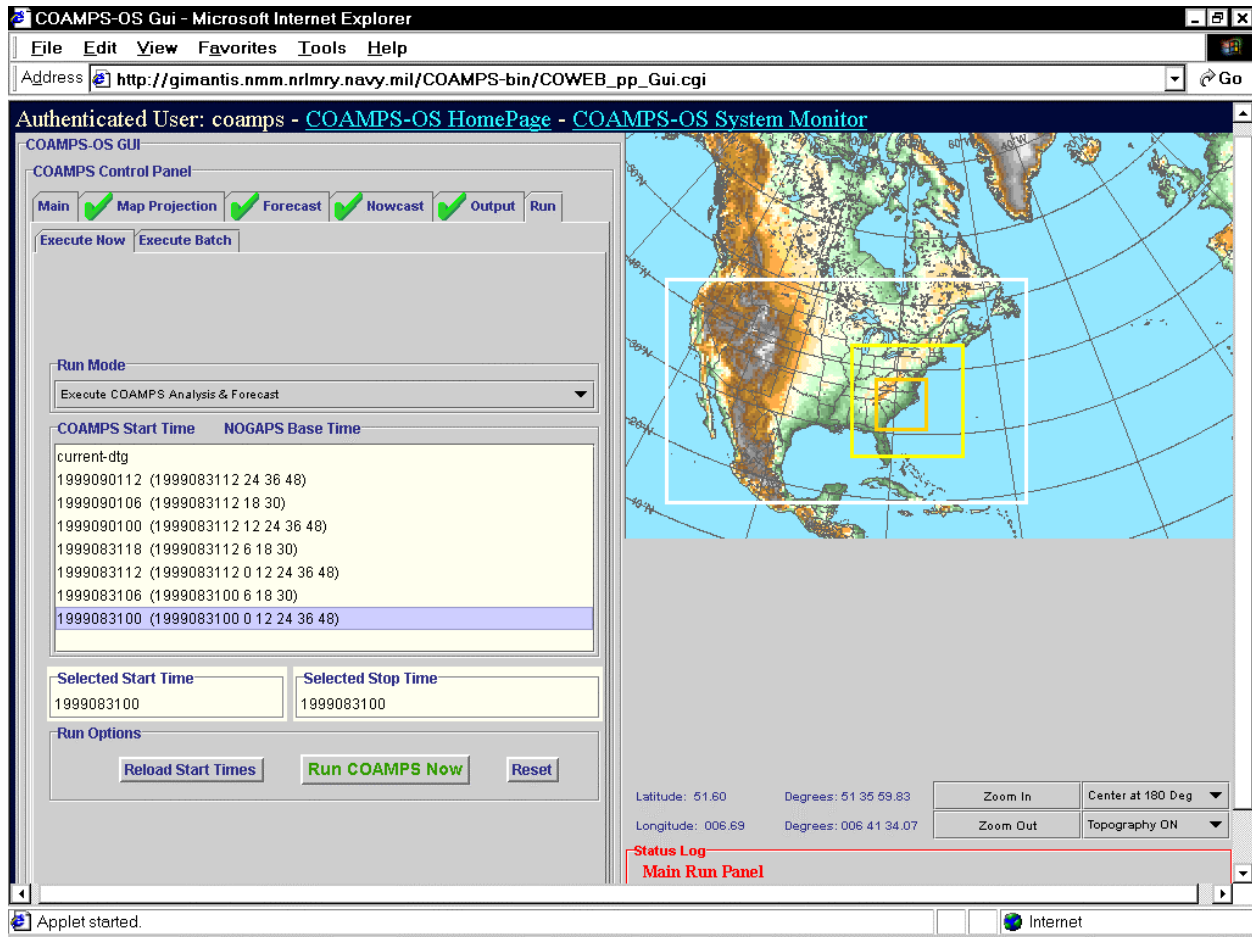
Figure 8. The Run panel is displayed.

The list of datetime groups will appear exactly as shown in Figure 8. *Note: if no datetime groups appear, the sample dataset was not properly loaded (refer to Section 4.1.1.2).* The available datetime groups are listed in Table 4-1.

Table 4-1. Available datetime groups for Example_Lambert project

COAMPS™ Start Time	NOGAPS Base Time
1999090112	1999083112 24 30 36
1999090106	1999083112 18 24 30 36
1999090100	1999083112 12 18 24 30 36
1999083118	1999083112 6 12 18 24 30 36
1999083112	1999083112 0 6 12 18 24 30 36
1999083106	1999083100 6 12 18 24 30 36
1999083100	1999083100 0 6 12 18 24 30 36

Highlight the 1999083100 datetime group (Figure 9), and click the **Run COAMPS™ Now** button.
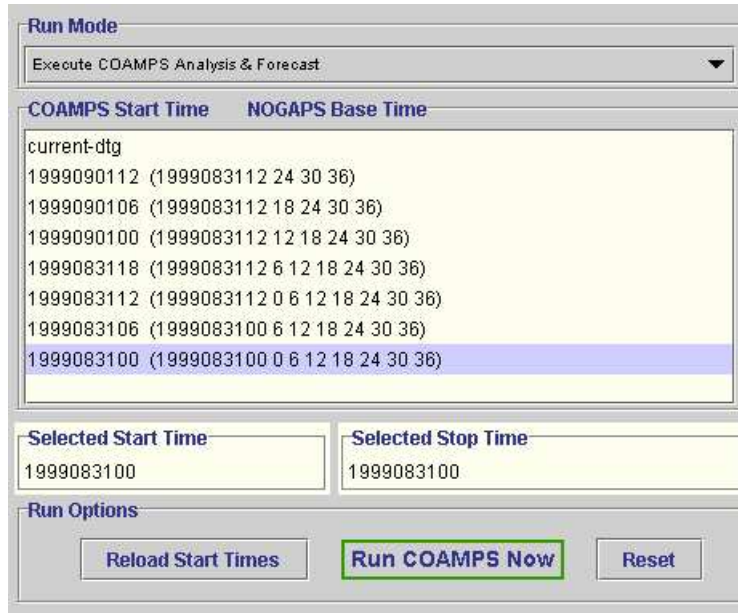
Figure 9. Datetime group selection panel.

5.   The run confirmation dialog window will appear and display the approximate run time of the project (Figure 10).   The actual run time should be approximately three hours.   *The estimated runtime calculation currently produces errors with certain grid configurations. The error will be fixed in a future release of the software.*
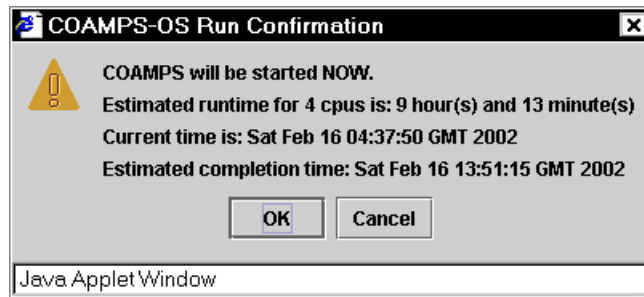
Figure 10. *Run Confirmation Dialog* showing the estimated run time and completion time for the project.

Click the **OK** button to proceed.

6.   The **Remote Monitor** window will appear (Figure 11) as a separate browser window.
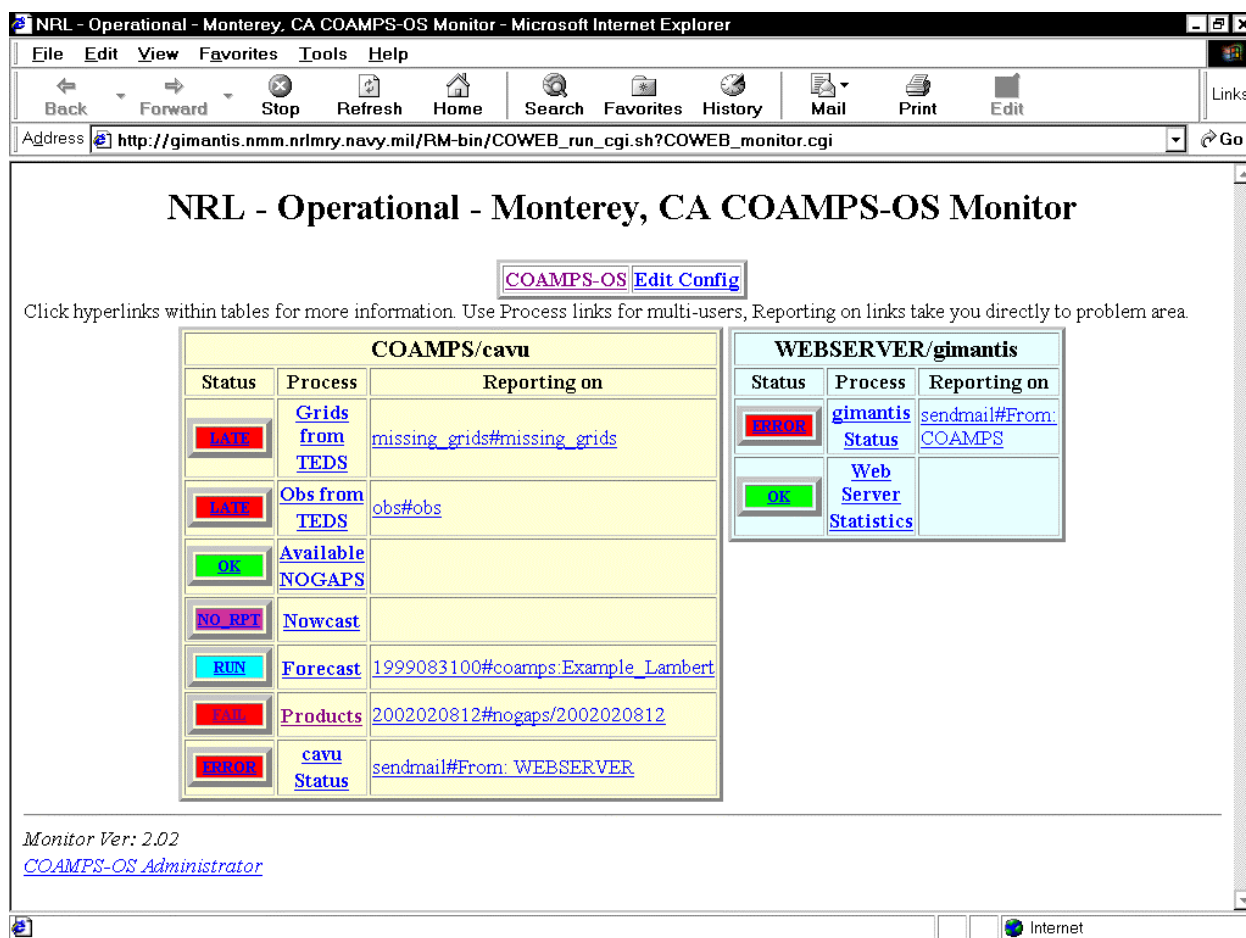
Figure 11. View of the *Remote Monitor* after starting Example_Lambert project. Status for the *Forecast Process* is *Run*.

A status of **Run** will appear next to the **Forecast** link in the **Remote Monitor** main page. The **Remote Monitor** always shows the status of the most recent datetime group. If the Example_Lambert run status does not appear, click on the **Forecast** link. *Note the **Remote Monitor** may require a few minutes to update the run status*.

7.   Wait and periodically check the **Time Step Plot**.

Figures 12 through 15 show the steps to display the **Time Step Plot**.
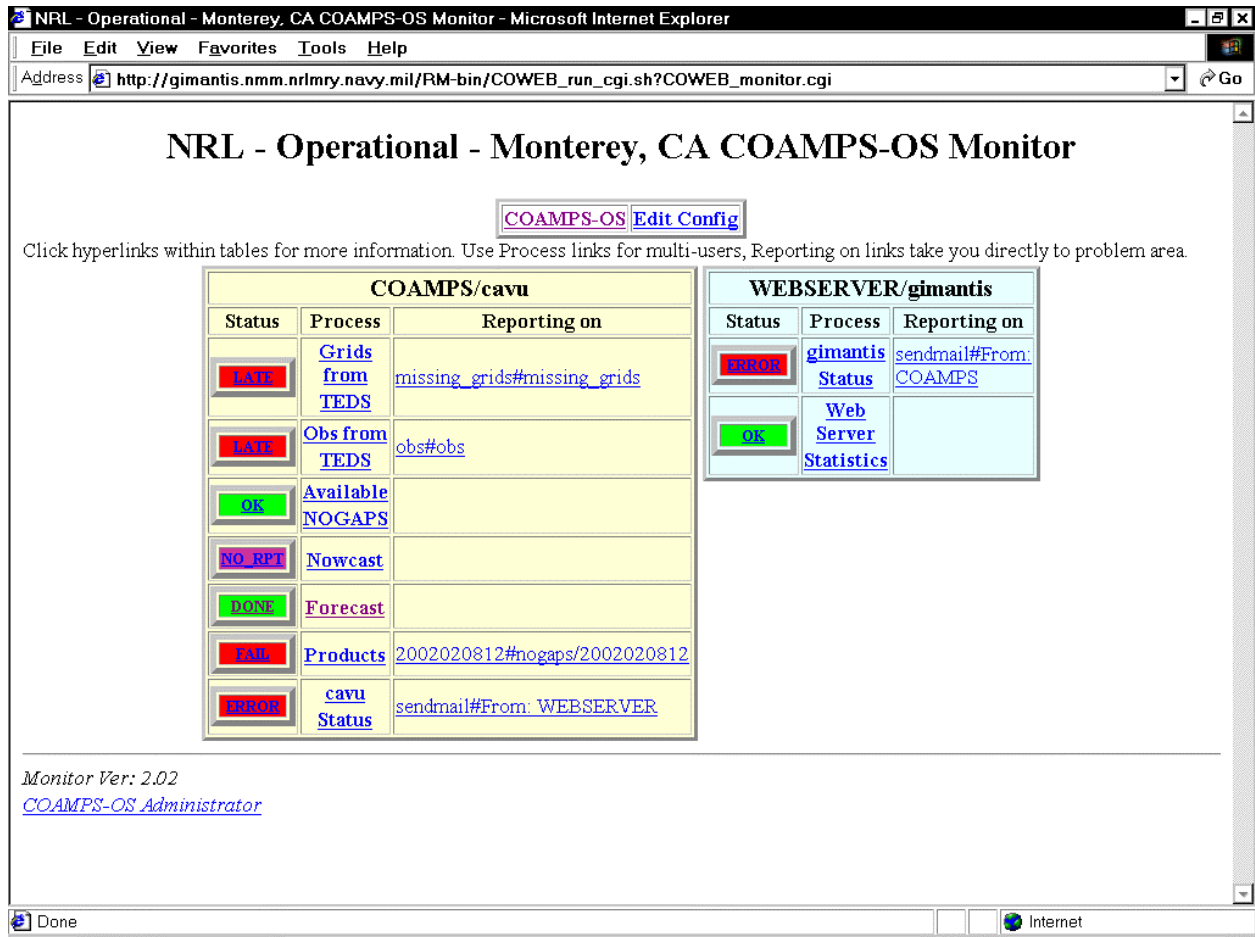
Figure 12. *Remote Monitor* **showing** *DONE* **status for the Example_Lambert forecast. In the** *Process* **column, click on the** *Forecast* **link.**
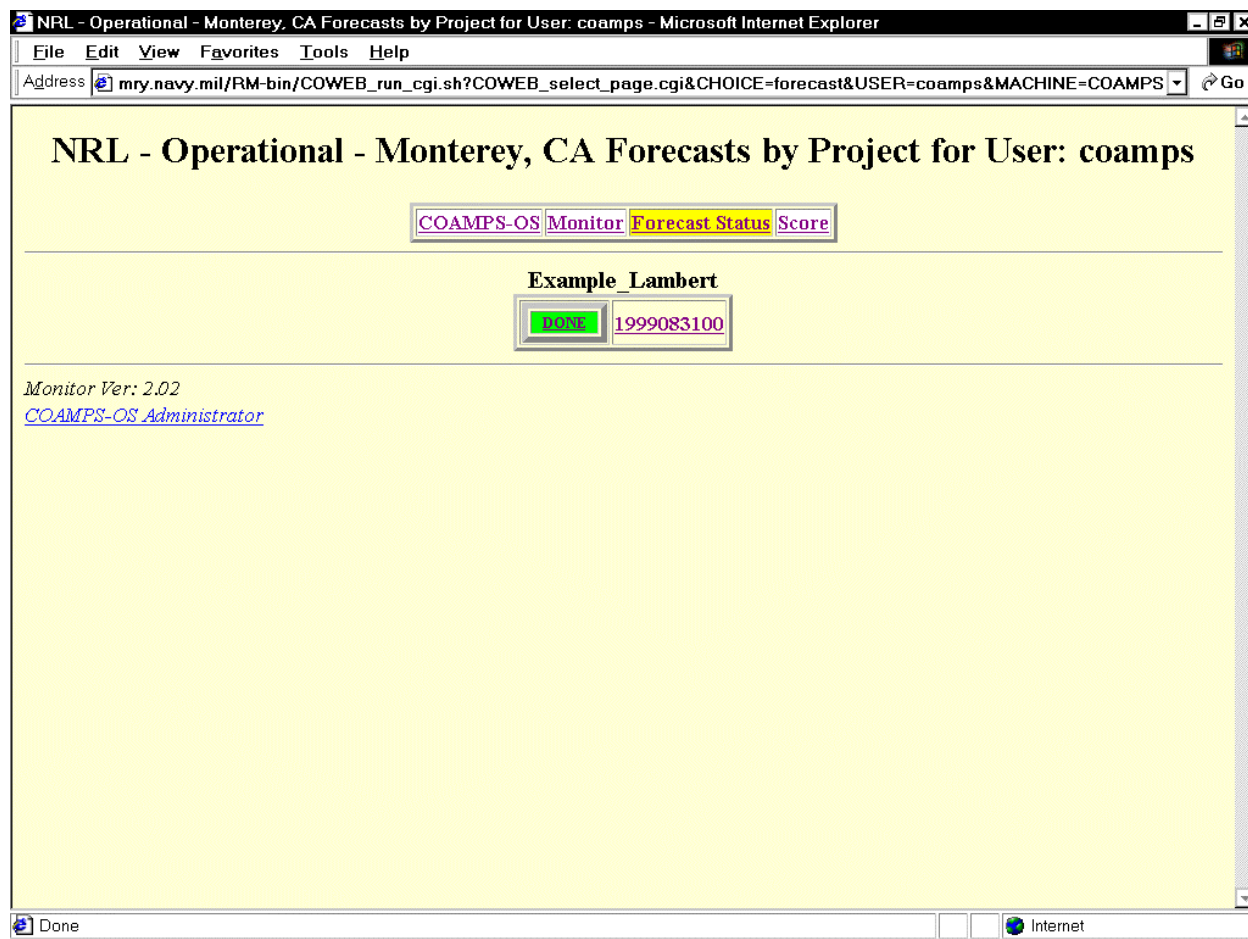
Figure 13. *Remote Monitor* **showing the available datetime groups for a particular project (Example_Lambert) and user (coamps). Click on the 1999083100 link.**
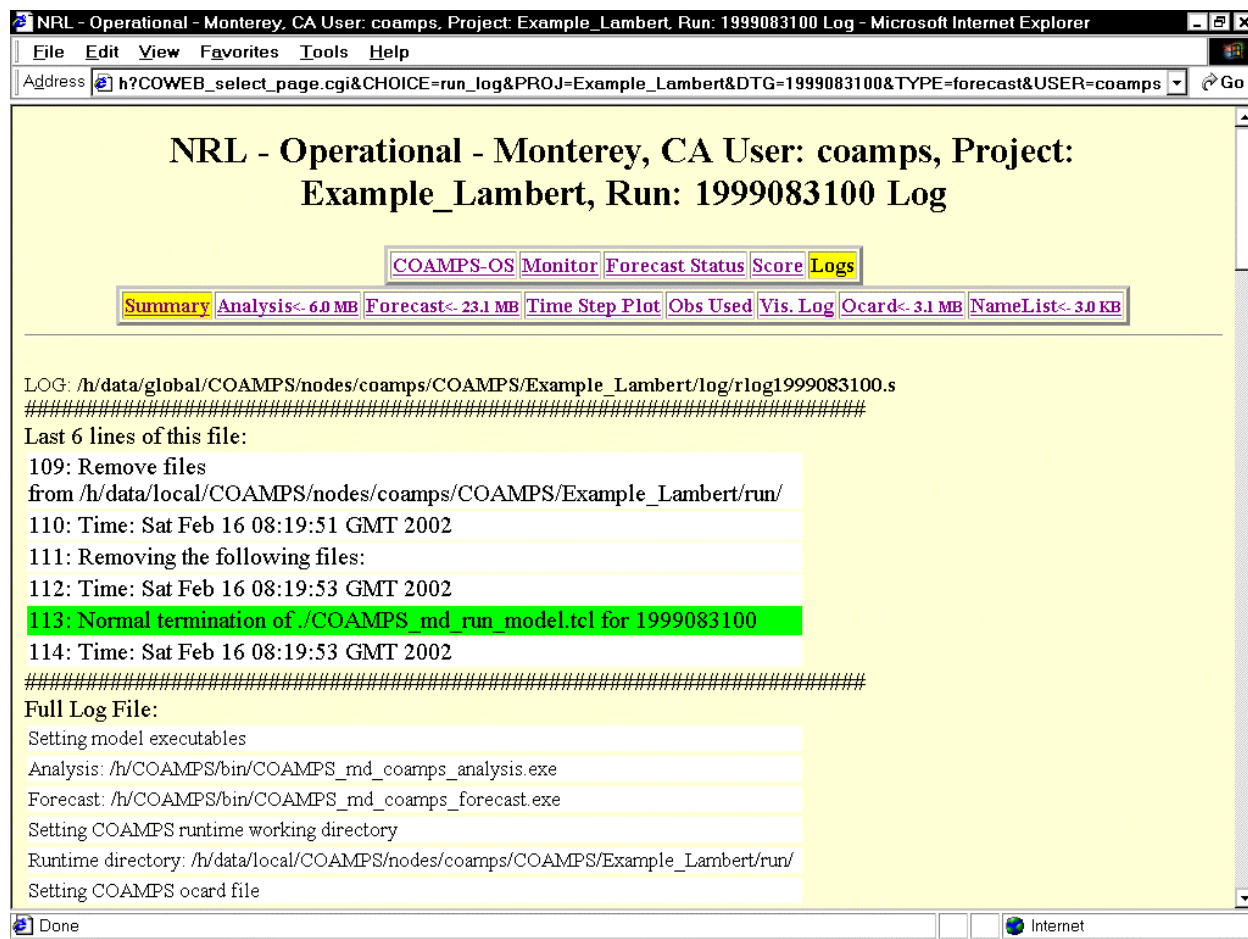
Figure 14. *Remote Monitor Summary* **page indicating the COAMPS™ model has completed successfully. Click the** *Time Step Plot* **button at the top of the page.**
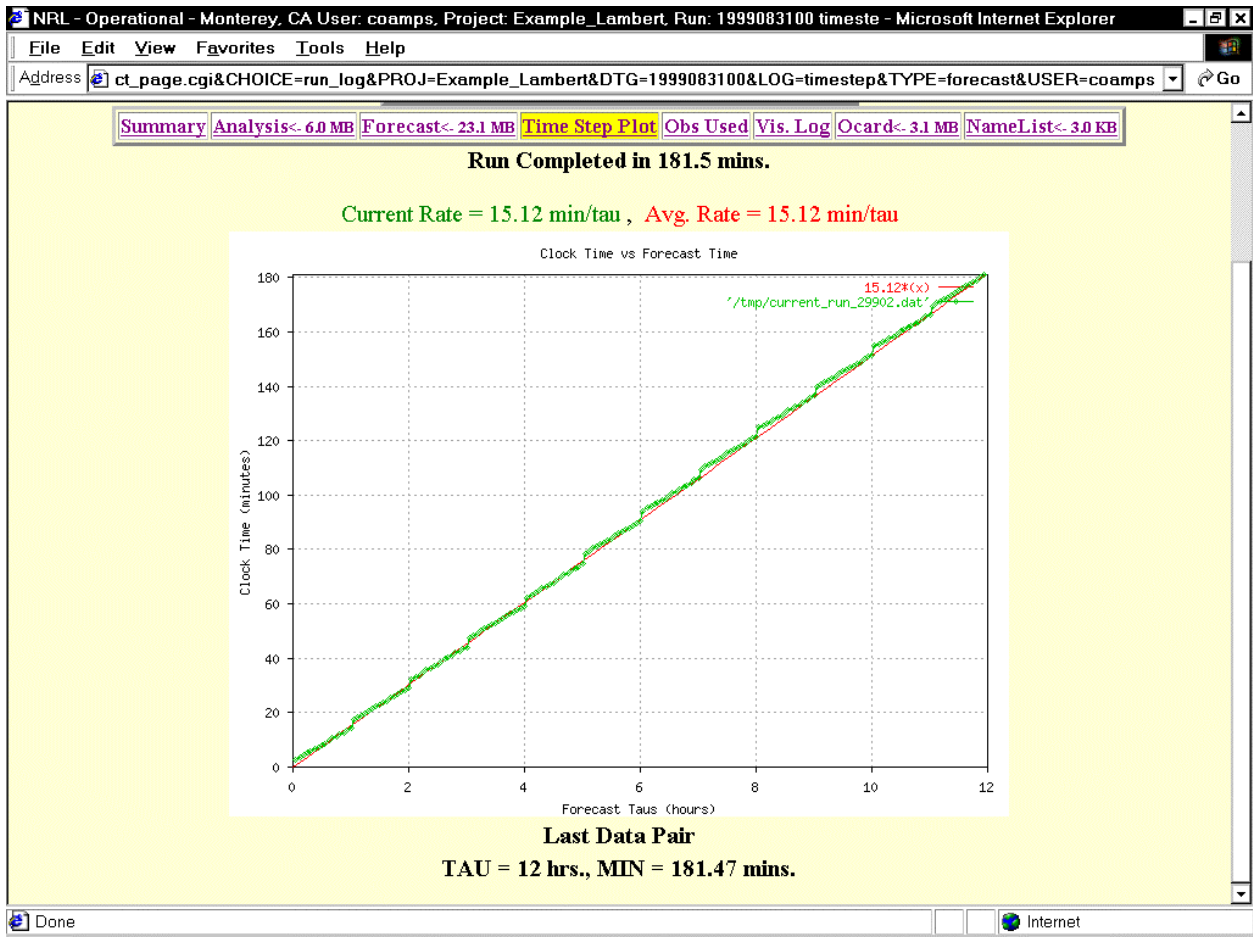
Figure 15. Run statistics shown by the *Remote Monitor*. The total completion time for the Example_Lambert project was 181.5 minutes with an average rate of 15.12 minutes per tau (hours).

8. Check the status of the Integrated Portable Visualization System (IPVS) processing.

Additional time is required for completing the IPVS products after the COAMPS™ forecast has completed. Click the **Vis. Log** button located at the top of the **Remote Monitor Summary** page.
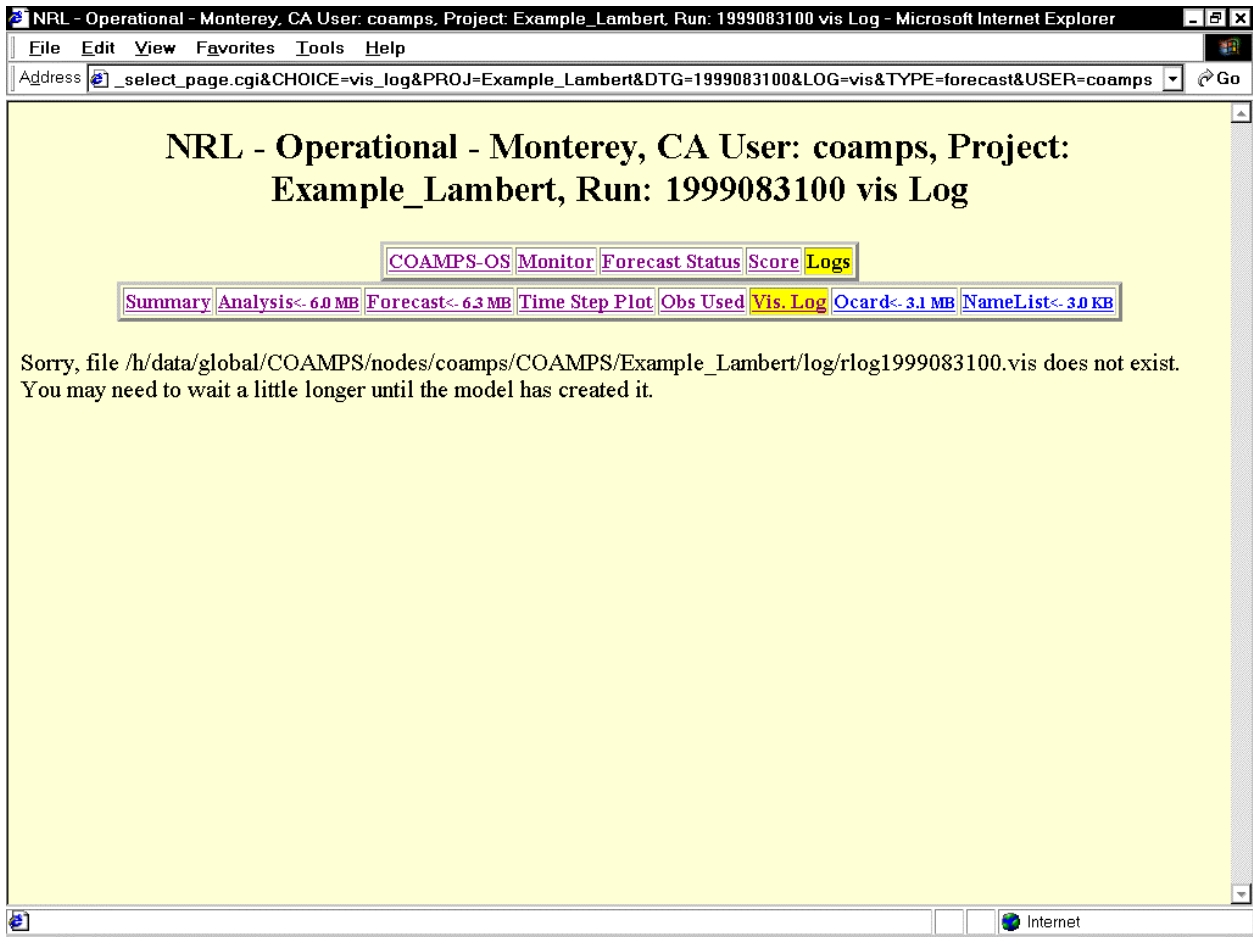
Figure 16. *Remote Monitor Vis. Log* **indicating that the IPVS products have not yet been generated.**

9. After the model and post-processing have completed, IPVS products will be available for the 1999083100 datetime group. Figure 17 shows the **Vis. Log** after the post-processing has completed.
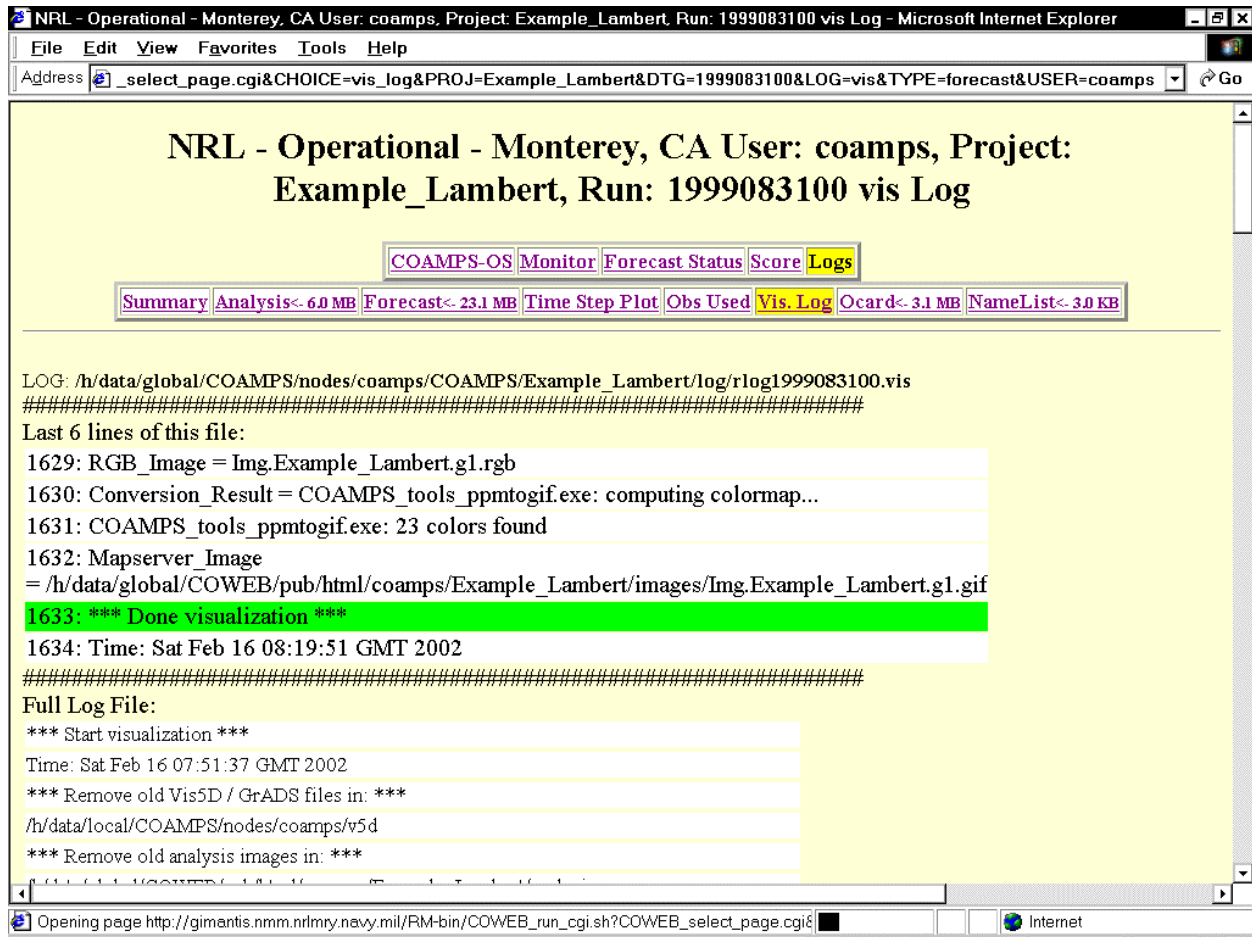
Figure 17. Remote Monitor Vis. Log indicating that IPVS products have been generated.

The IPVS webpage, shown in Figure 18, will display the project name, datetime group, **Analysis Products**, and **Observations** in the left panel. The right panel will show a product matrix extended to twelve hours and filled with green **O**'s.

Figure 18. Available projects are listed in the left frame of the IPVS webpage, and available images are shown in the product matrix of the right frame.

10. View the forecast products for the Example_Lambert 1999083100 datetime group.

Access the first image by clicking the green **O** link for the Field labeled "Sea Lev Pres/1000-500mb Thickness/Sfc Temp" at Time 12 for the 81km grid. Each image may be accessed from the product matrix in a similar fashion. Figures 19 through 24 show 12-hour forecasts for the 1999083100 datetime group of the Example_Lambert.

Note that older versions of some browsers may not support PNG imagery, in which case the visualization products will not be displayed.
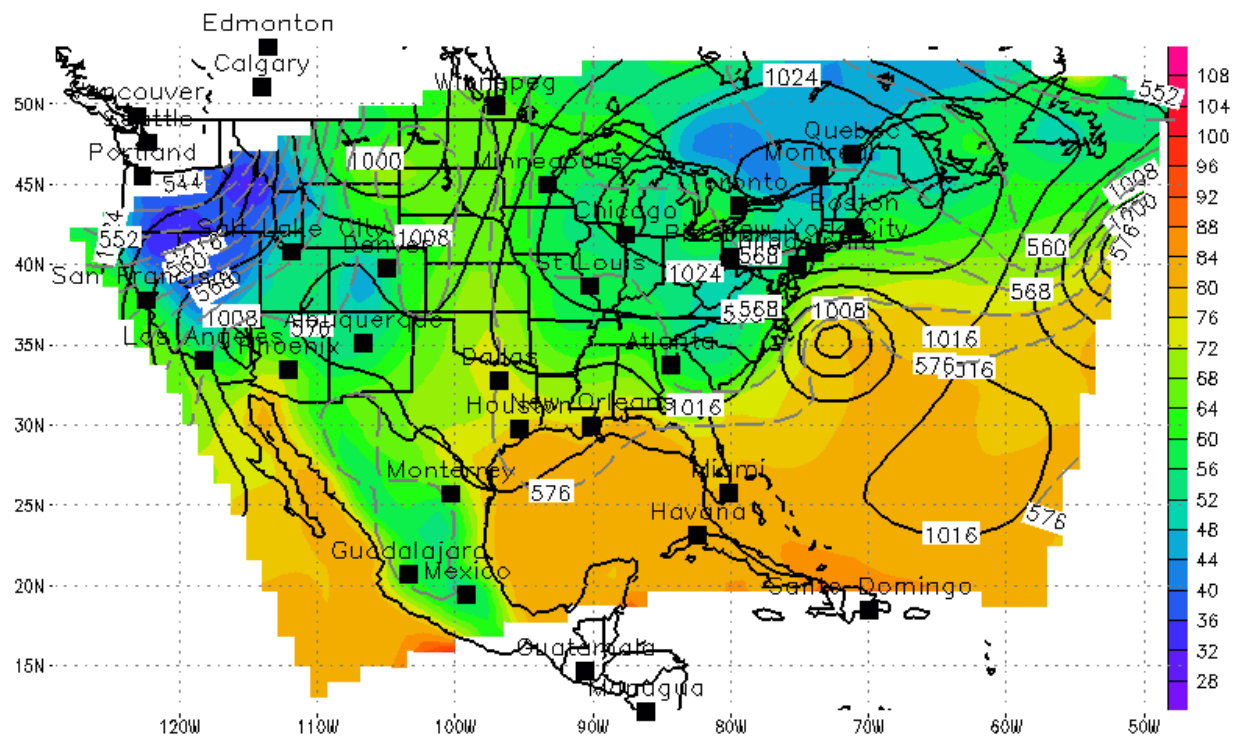
Figure 19. IPVS product "Sea Lev Pres/1000-500mb Thickness/Sfc Temp" for the 81km mesh at tau 12. Hurricane Dennis is identified by the 1008 mb contour off the North Carolina coast. Hurricane Cindy is shown off the eastern edge of the grid.
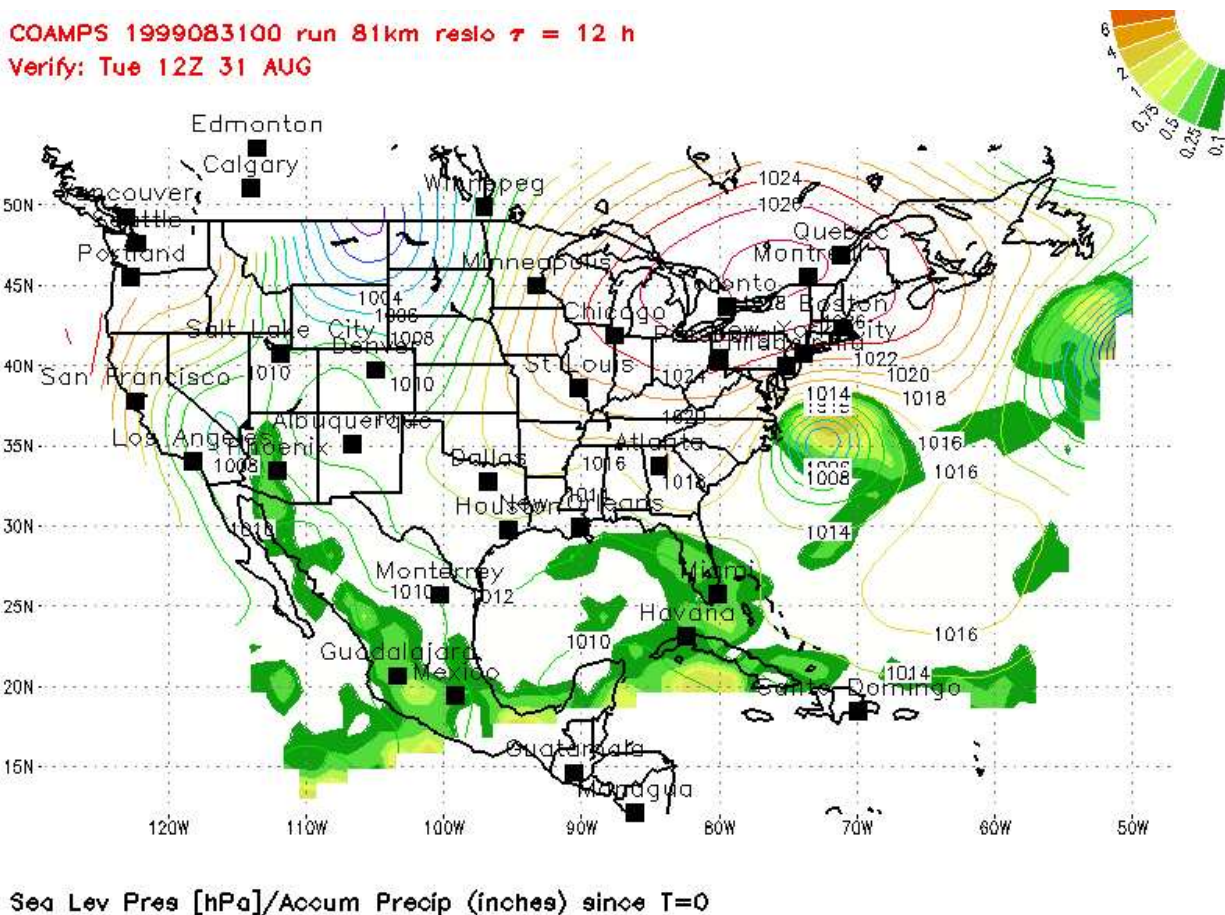
Figure 20. Sea level pressure and accumulated precipitation analyses for the 81km mesh at tau 12. Note more than one inch of accumulated precipitation exists at the center of Hurricane Dennis, shown off the East Coast.
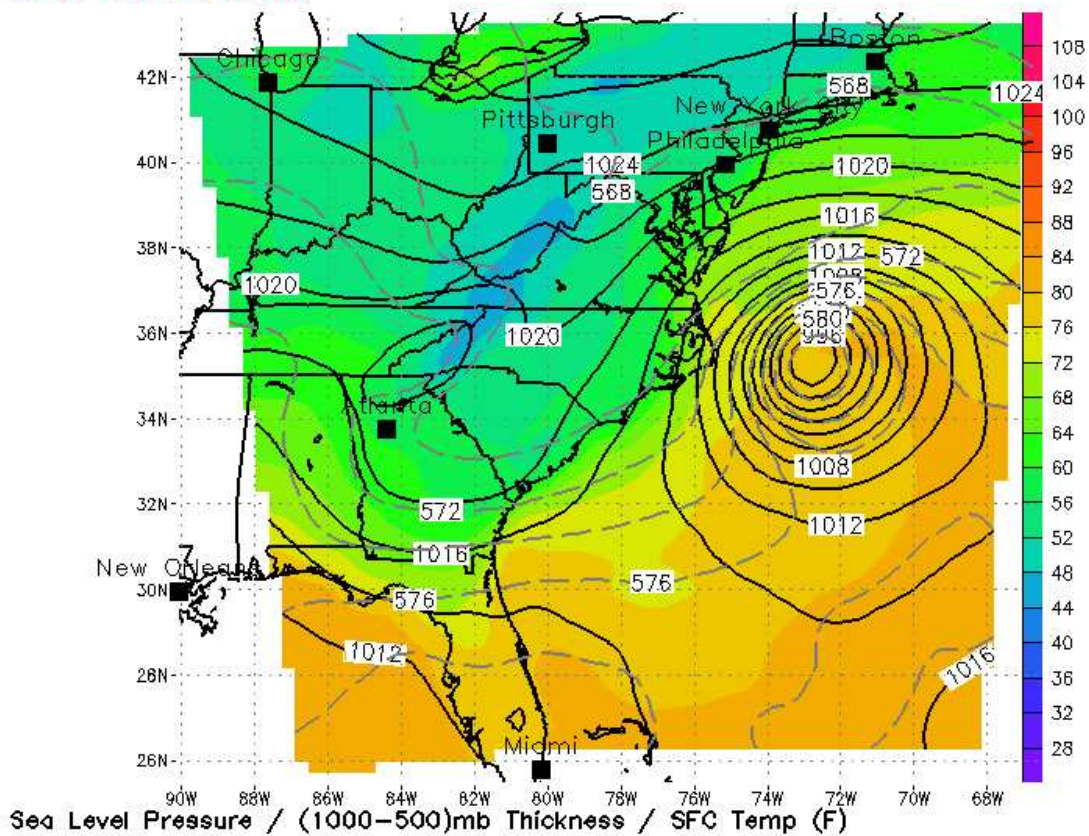
Figure 21. Sea Level Pressure and Surface Temperature analyses for the 27km mesh at tau 12. At the center of Hurricane Dennis is a 996 mb contour of sea level pressure, shown by a solid black line.

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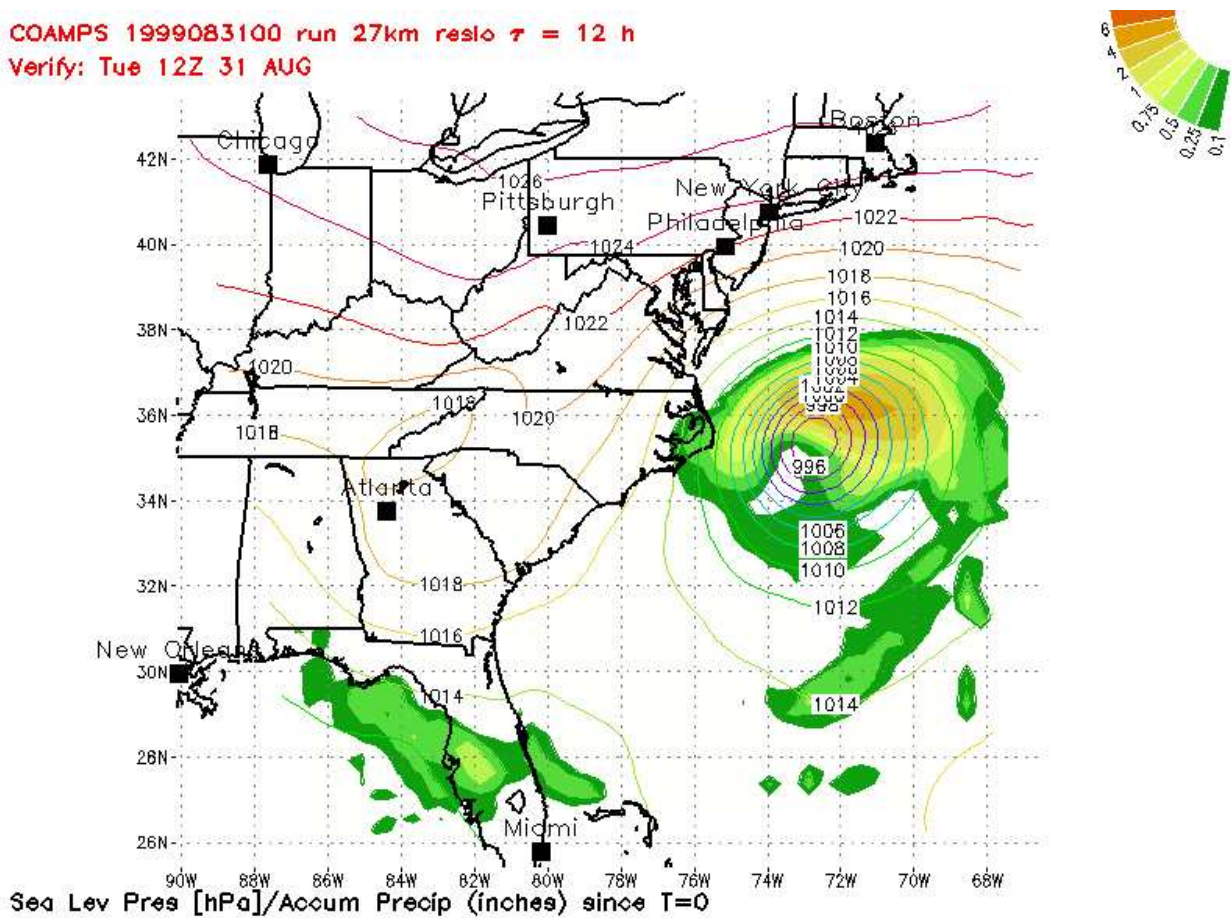
Figure 22. Sea level pressure and accumulated precipitation analyses for the 27km mesh at tau 12. The maximum value of accumulated precipitation since tau 0 is approximately 4 inches near the 996 mb contour (Hurricane Dennis).
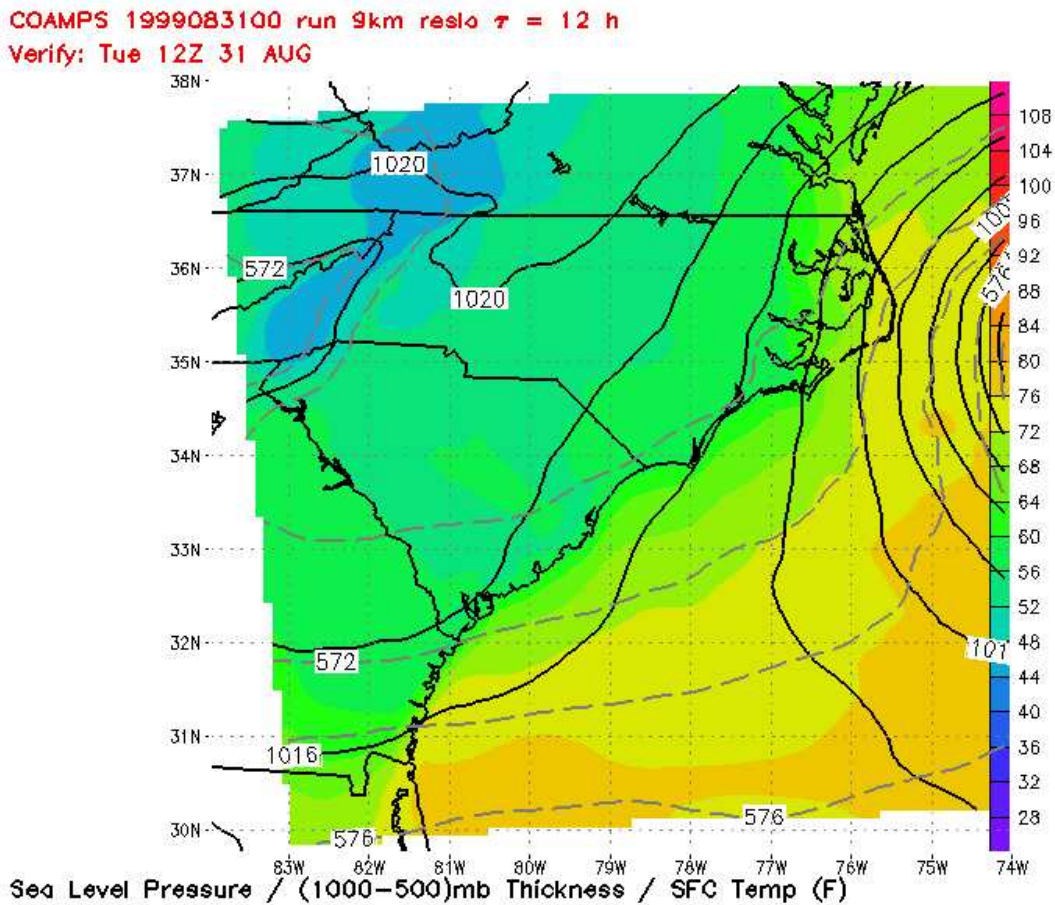
Figure 23. Sea level pressure and surface temperature analyses for the 9km mesh at tau 12. The maximum pressure shown in the image is 1020 mb, located near the northwest corner of the grid.

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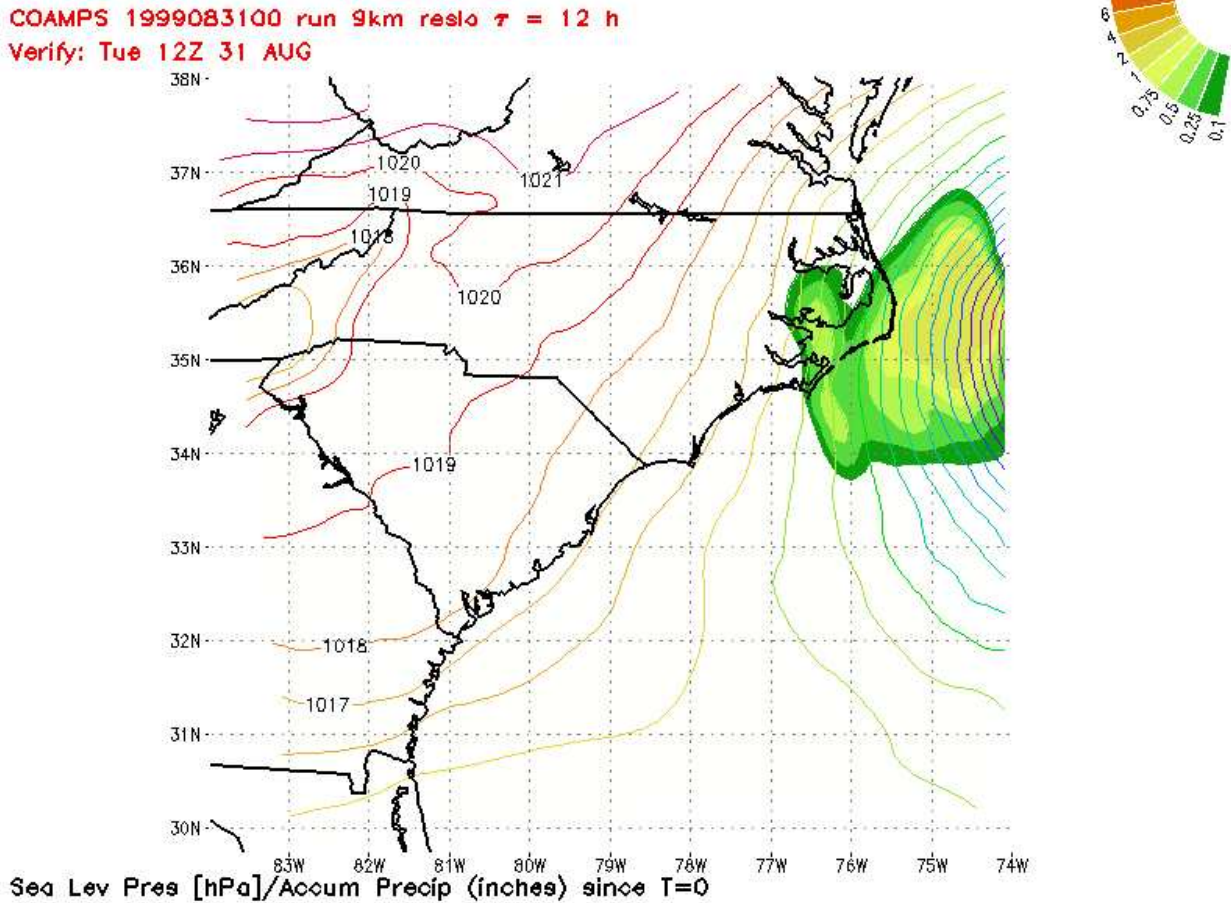
Figure 24. Sea level pressure and accumulated precipitation analyses for the fine mesh at tau 12. The maximum accumulated precipitation since tau 0 is approximately 1 inch, located near the eastern edge of the grid

11. View the analysis products for the 1999083100 datetime group of the Example_Lambert project.

Click the **Analysis Products** link, located in the right frame of the IPVS webpage, to access the analysis images. In the top right panel, shown in Figure 25, select the 19999083100 datetime group and appropriate product. Figures 26 through 34 show analysis products for terrain height, ground wetness, and sea level pressure from each nest.

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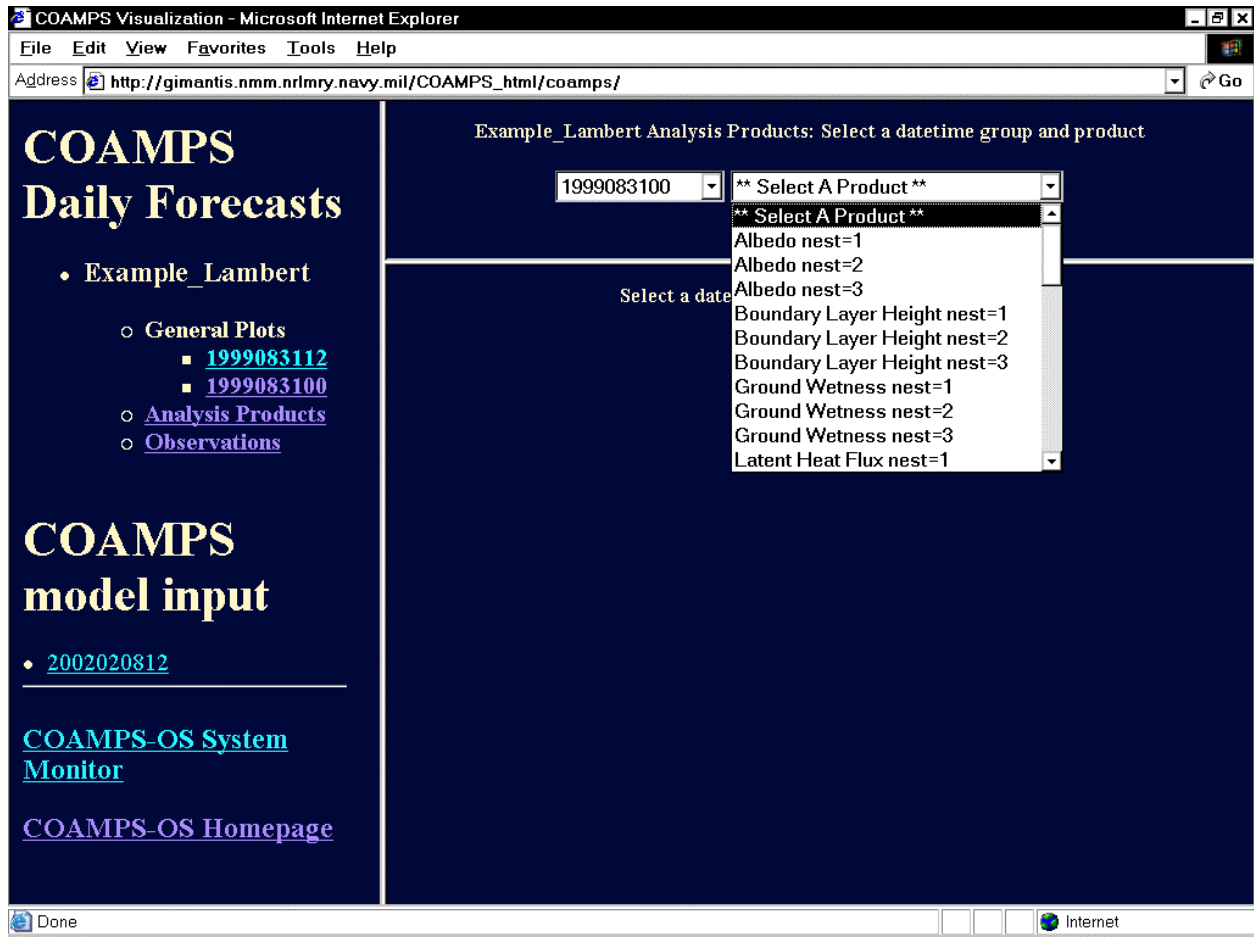
Figure 25. Select analysis products for the 1999083100 datetime group.
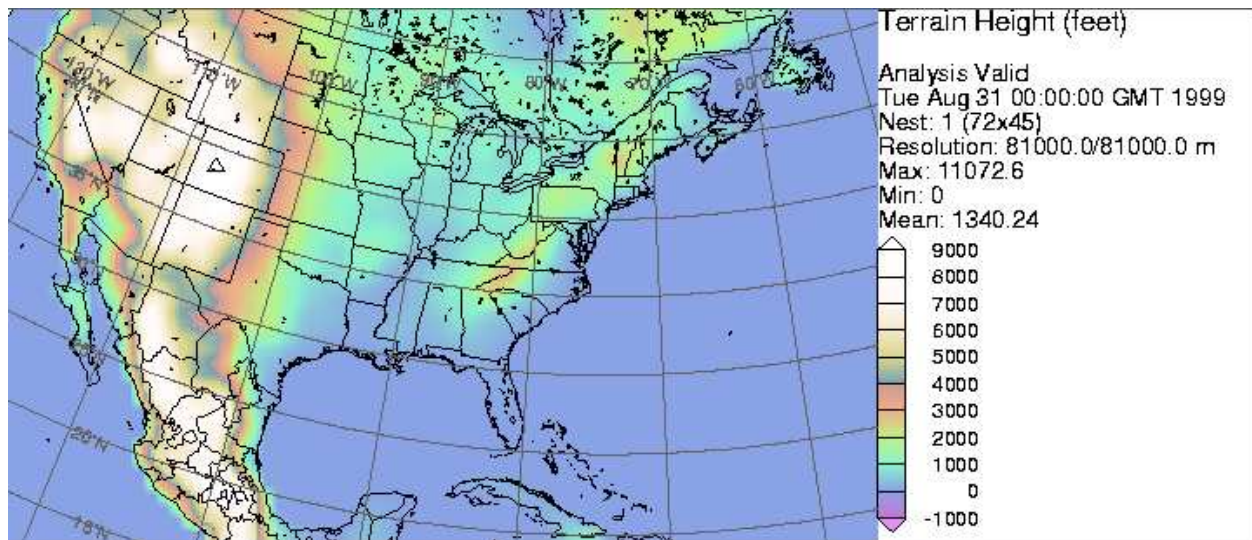
Figure 26. Terrain Height for the 81km COAMPS™ nest.
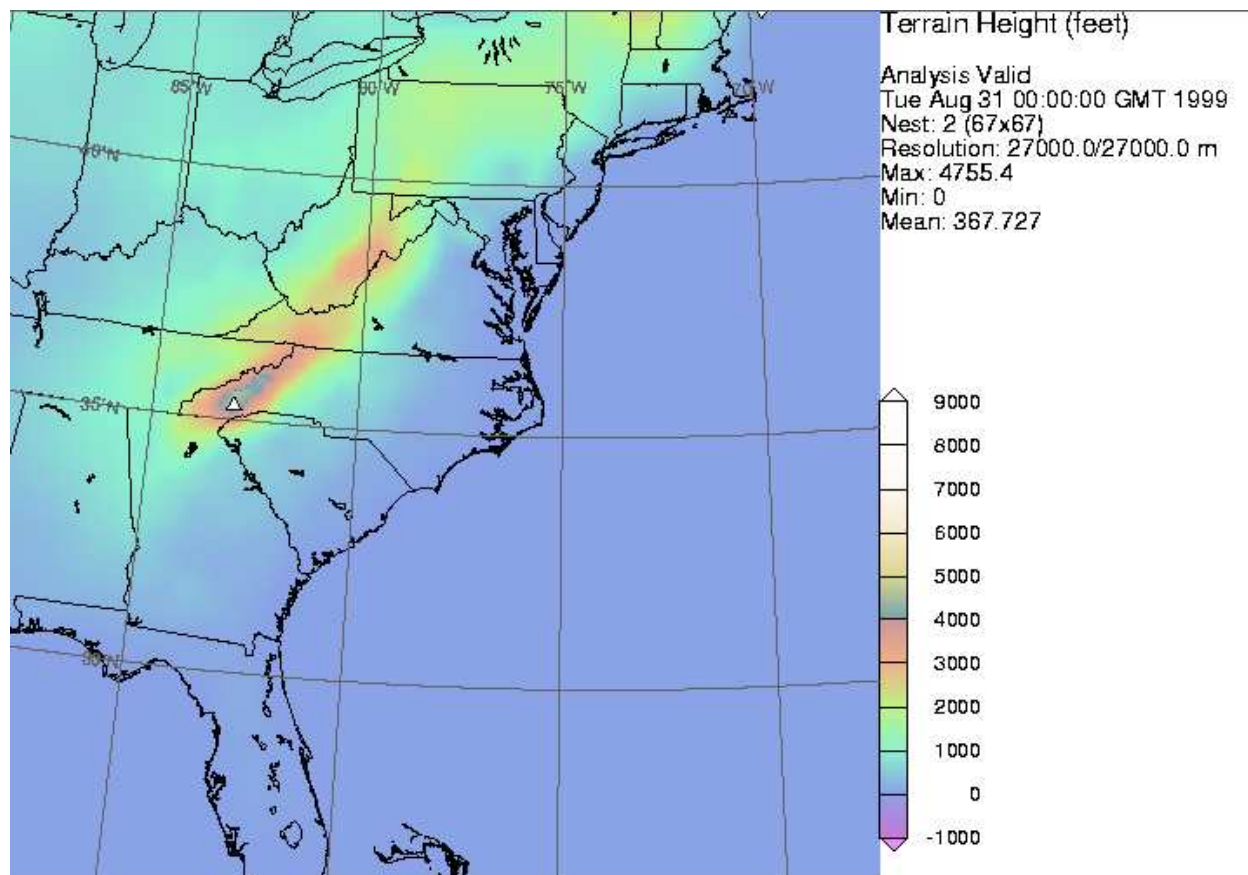
Figure 27. Terrain Height for the 27km COAMPS™ nest.
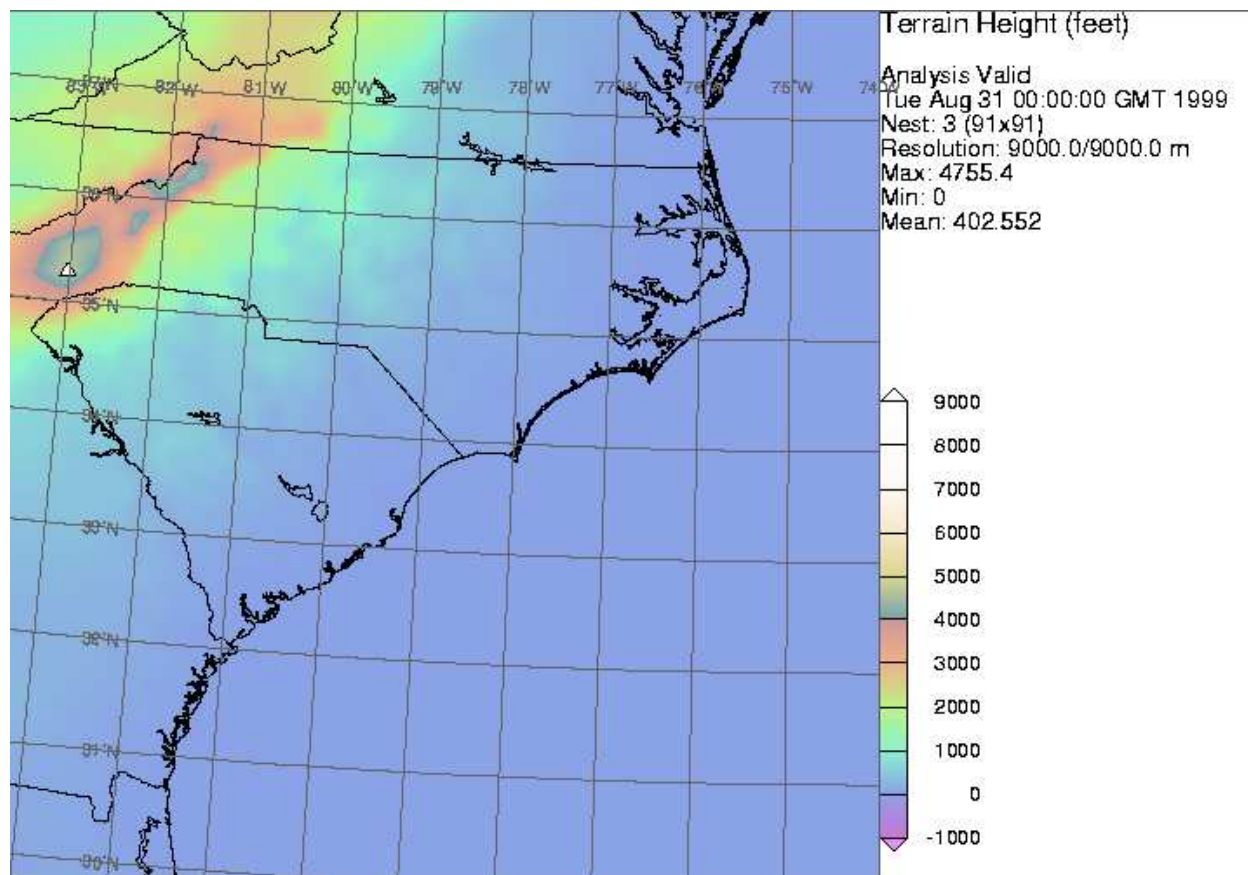
Figure 28. Terrain Height for the 9km COAMPS™ nest.
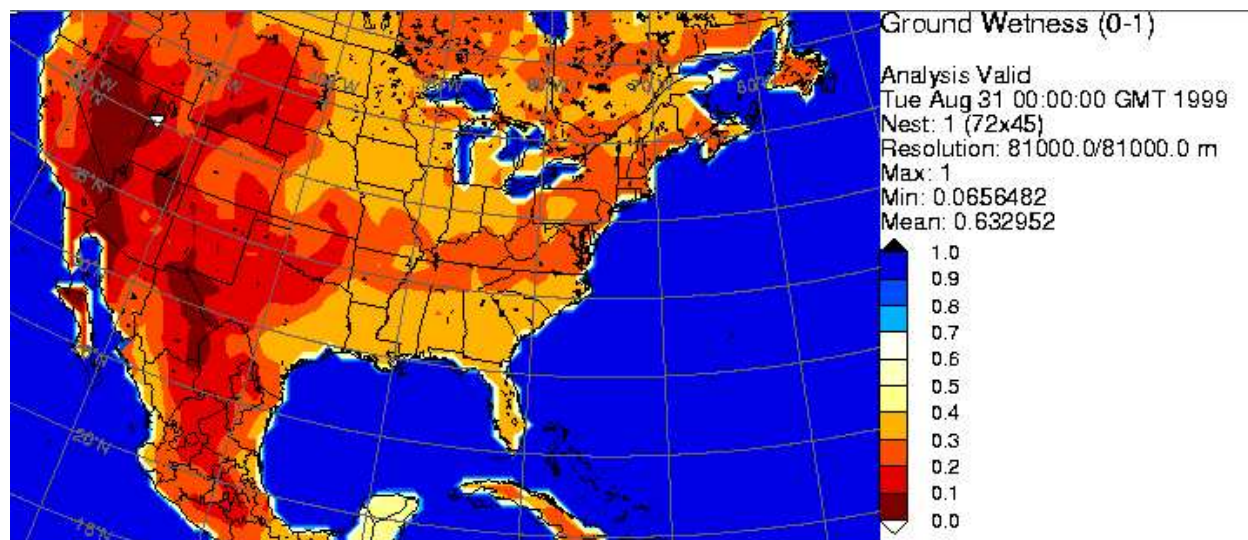
Figure 29. Ground Wetness for the 81km COAMPS™ nest.
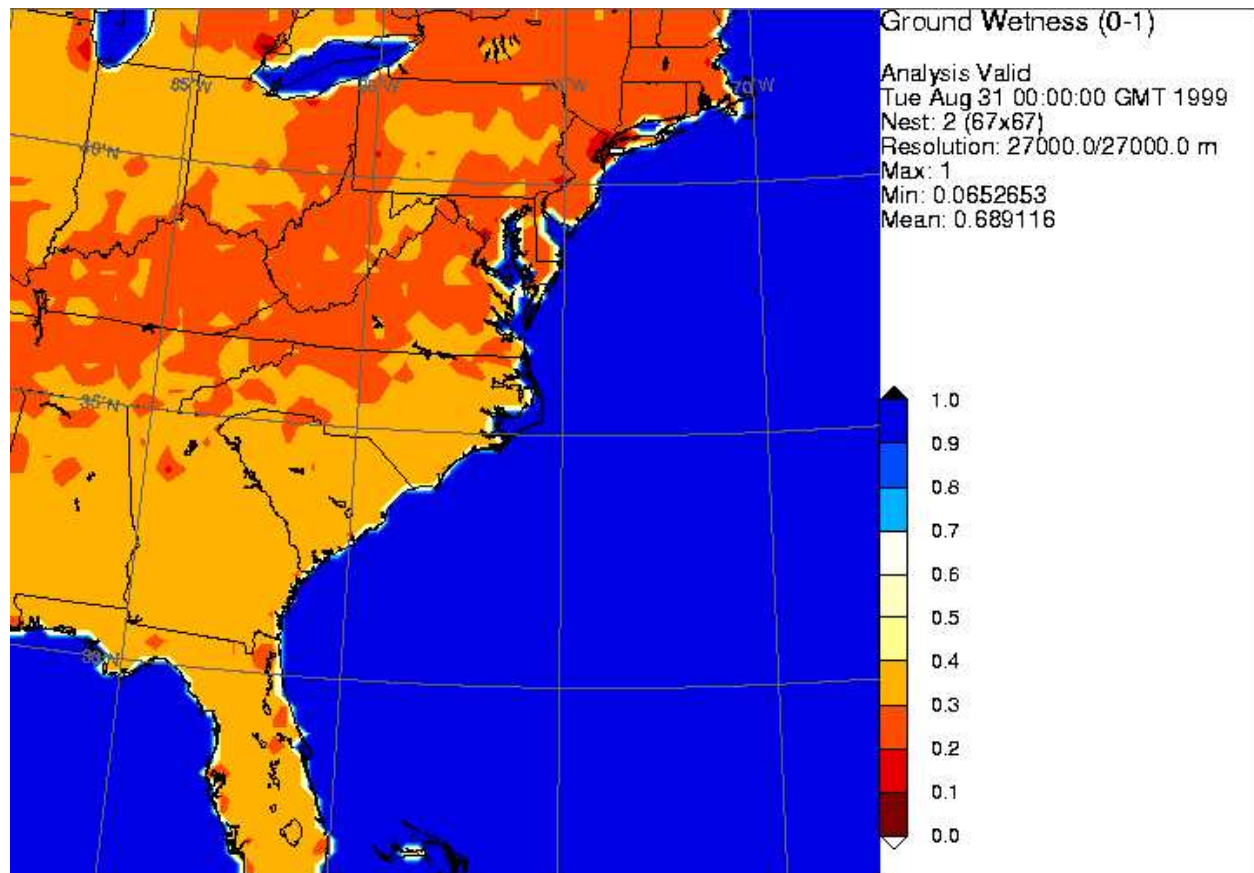
Figure 30. Ground Wetness for the 27km COAMPS™ nest.
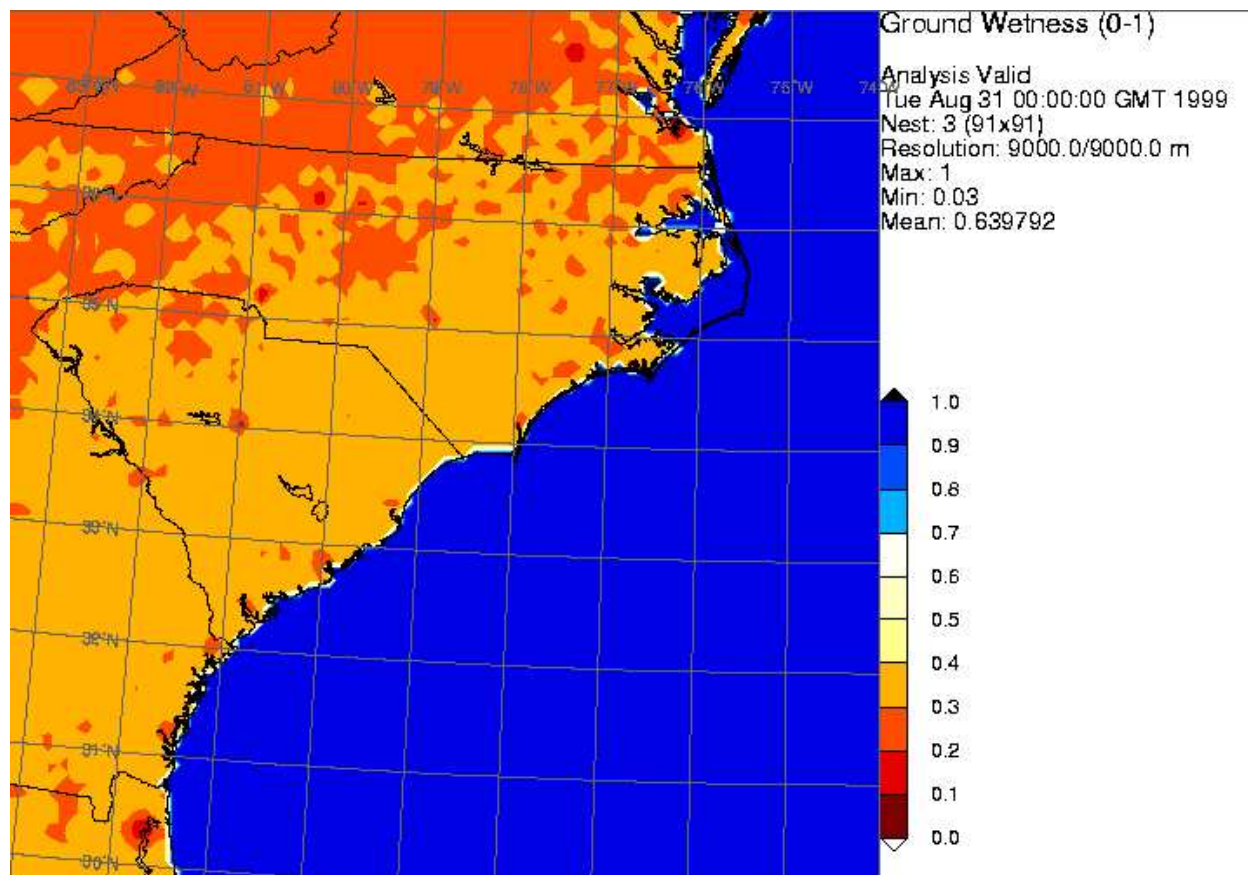
Figure 31. Ground Wetness for the 9km COAMPS™ nest.
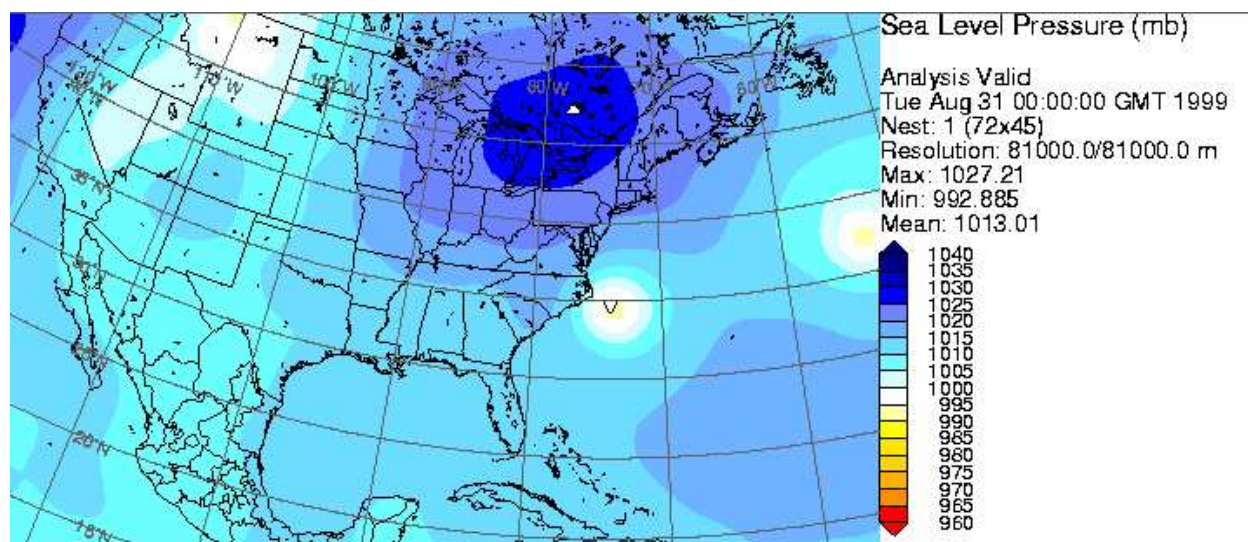
Figure 32. Sea Level Pressure for the 81km COAMPS™ nest.
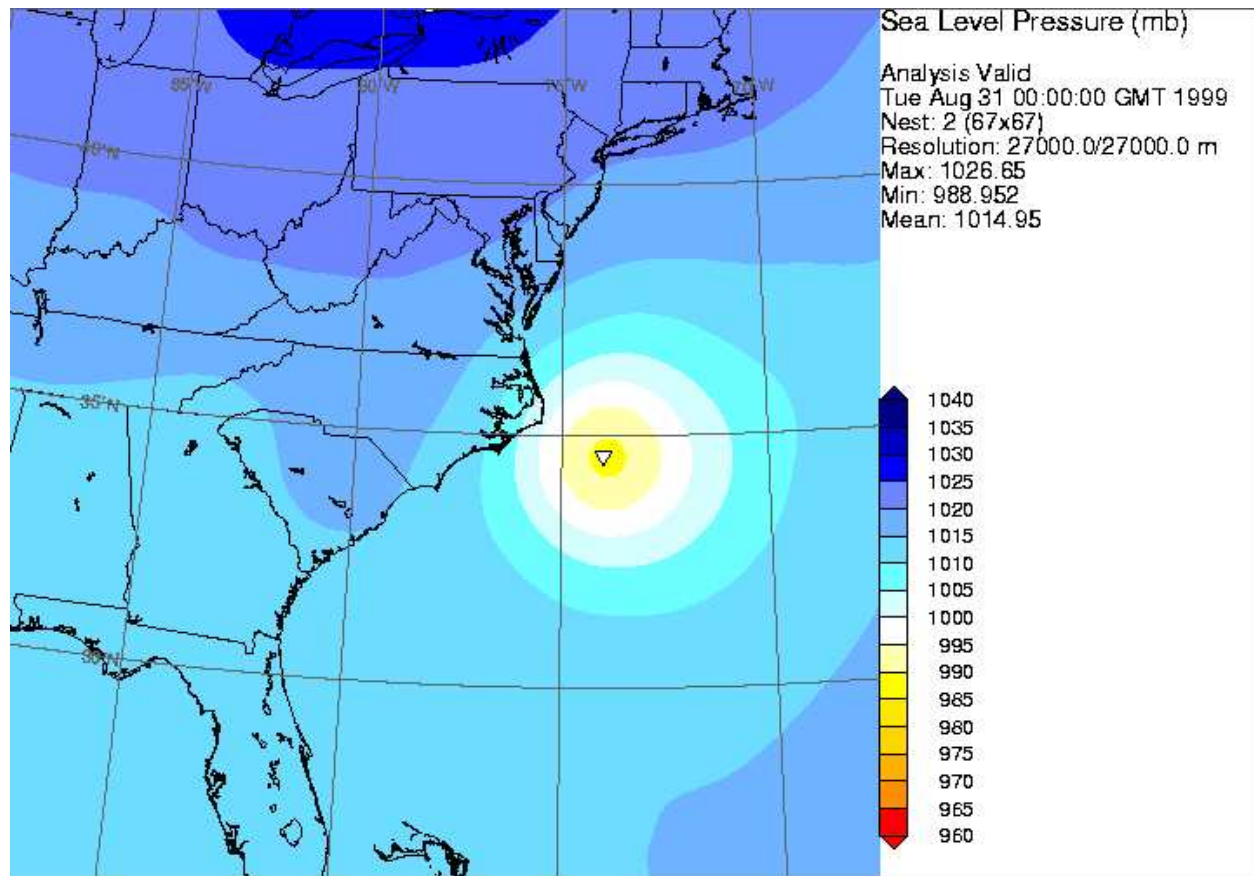
Figure 33. Sea Level Pressure for the 27km COAMPS™ nest.
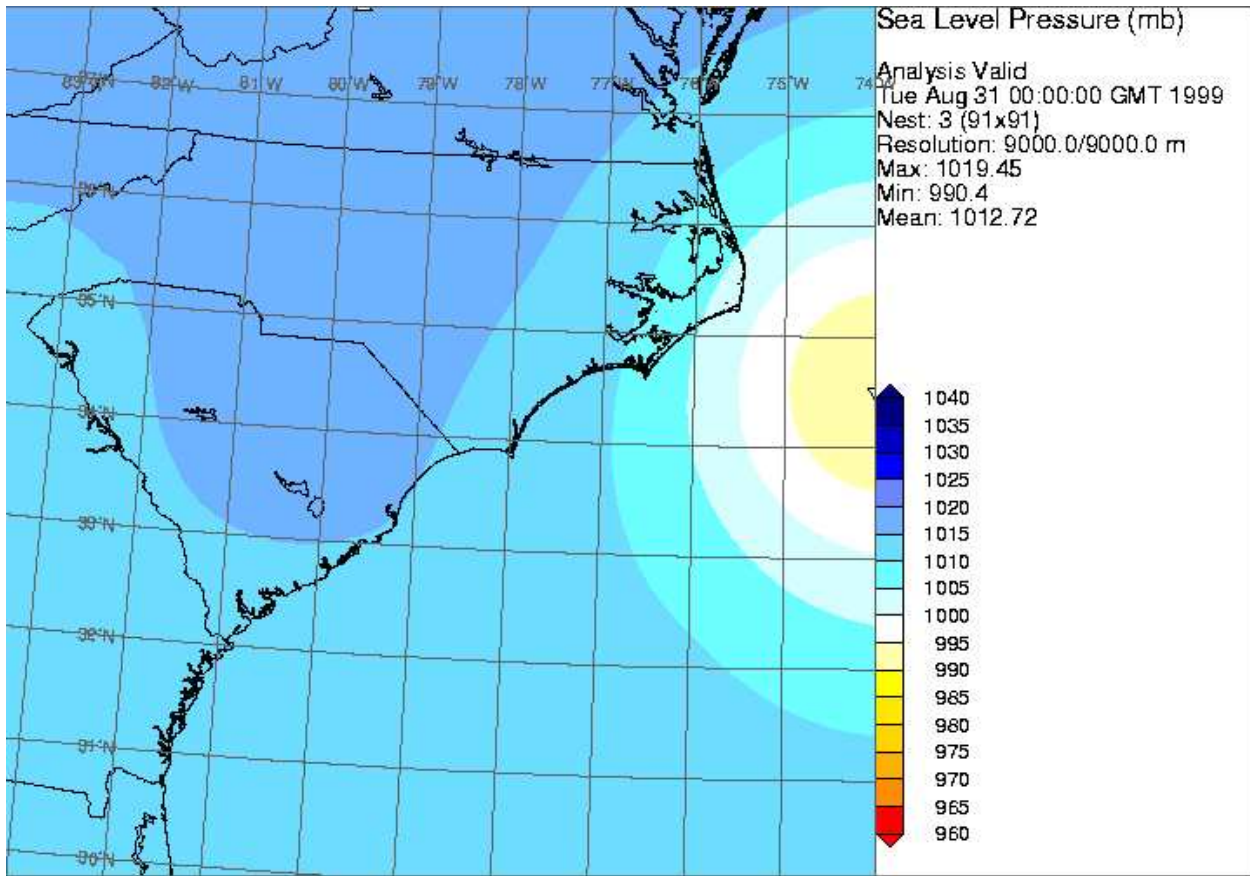
Figure 34. Sea Level Pressure for the 9km COAMPS™ nest.

Note the presence of Hurricane Dennis and Cindy in the sea level pressure images. Also note the maximum (**Max**) and minimum (**Min**) values listed in the right panel. Table 4-2 summarizes the maximum, minimum, and mean values for each product at each nest. Use the information from Table 4-2 to quantitatively verify performance of the COAMPS™ analysis.

Table 4-2. Values for Example_Lambert 1999083100 Analysis Values

Product (units)	Nest	Maximum	Minimum	Mean
Terrain Height (feet)	1	11072.6	0	1340.24
Terrain Height (feet)	2	4755.4	0	367.727
Terrain Height (feet)	3	4755.4	0	402.552
Ground Wetness (0-1)	1	1	0.656482	0.632952
Ground Wetness (0-1)	2	1	0.652653	0.689116
Ground Wetness (0-1)	3	1	0.03	0.639792
Sea Level Pressure (mb)	1	1027.21	992.885	1013.01
Sea Level Pressure (mb)	2	1026.65	988.952	1014.95
Sea Level Pressure (mb)	3	1019.45	990.4	1012.72

12. View the observation products for the Example_Lambert 1999083100 datetime group.

The observation images are accessed by clicking the **Observations** link from the left frame shown in Figure 35. In the upper right frame, select the 1999083100 datetime group and desired products (Figure 35). Figures 36 through 41 show the aircraft reports and upper air observation products for all nests.
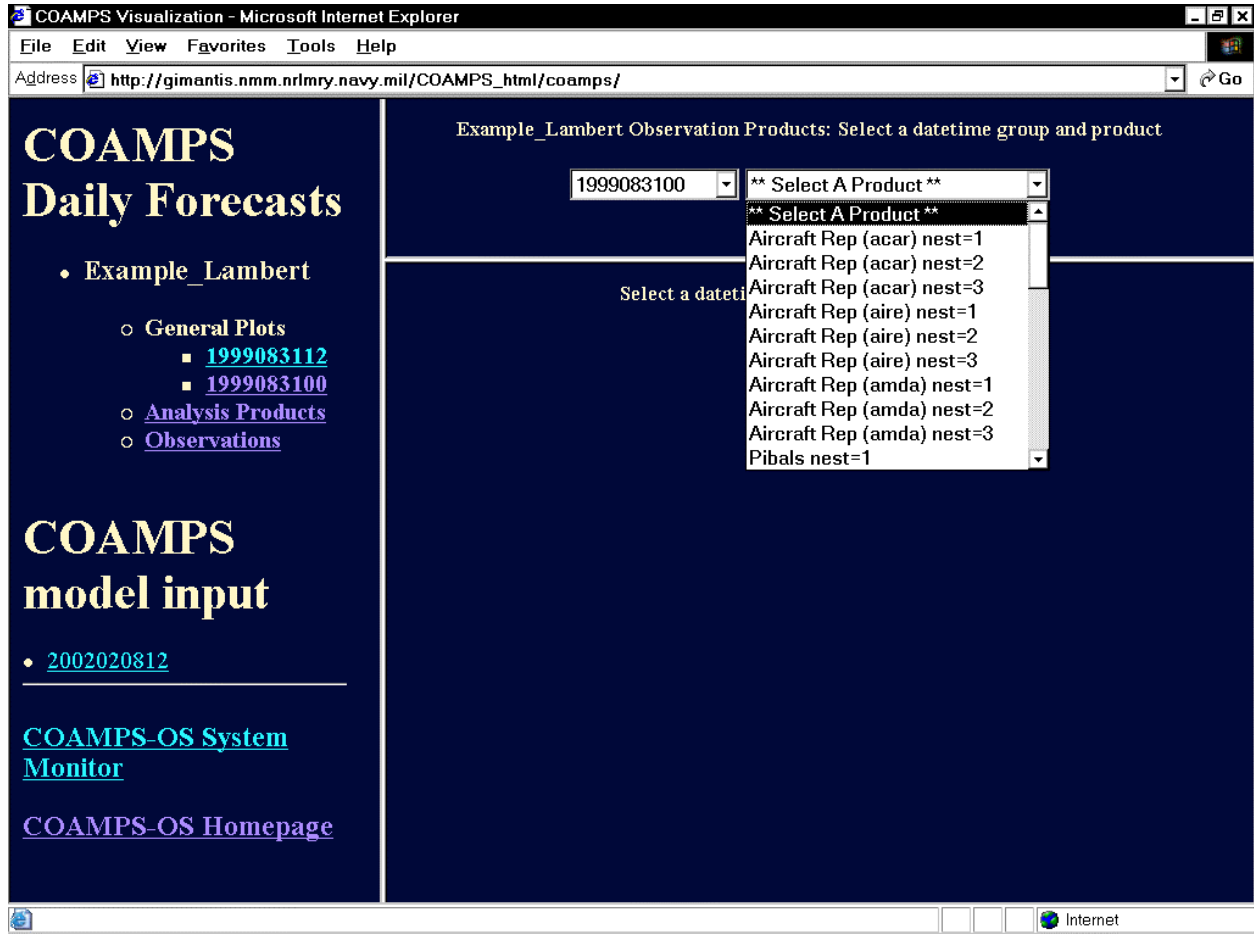
Figure 35. Select from a list of observation products for the 1999083100 datetime group.
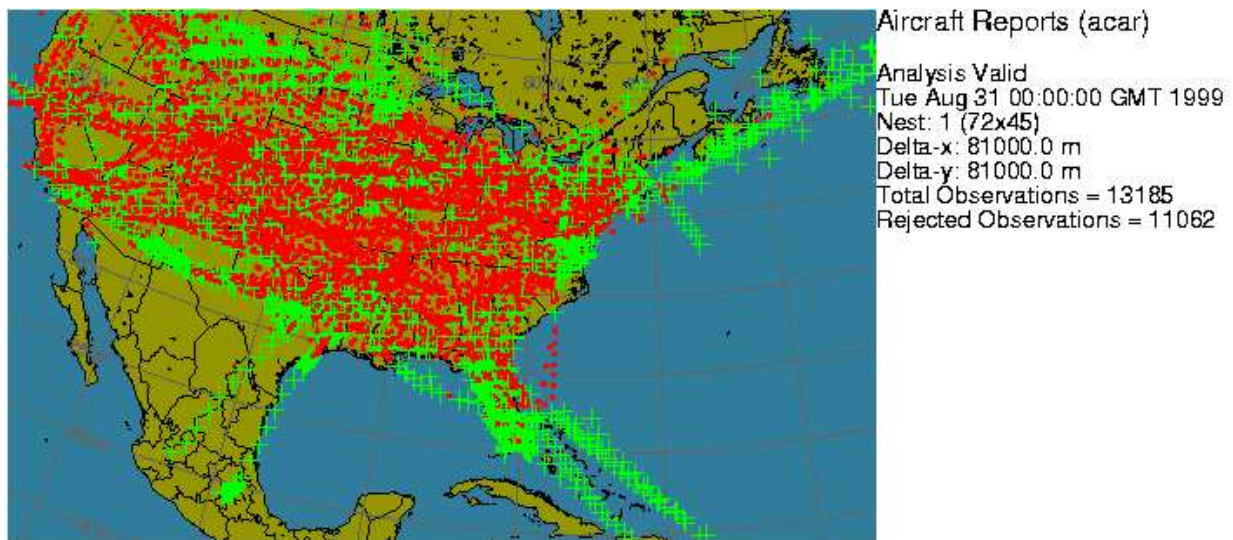
Figure 36. Aircraft reports for the 81km COAMPS™ nest.
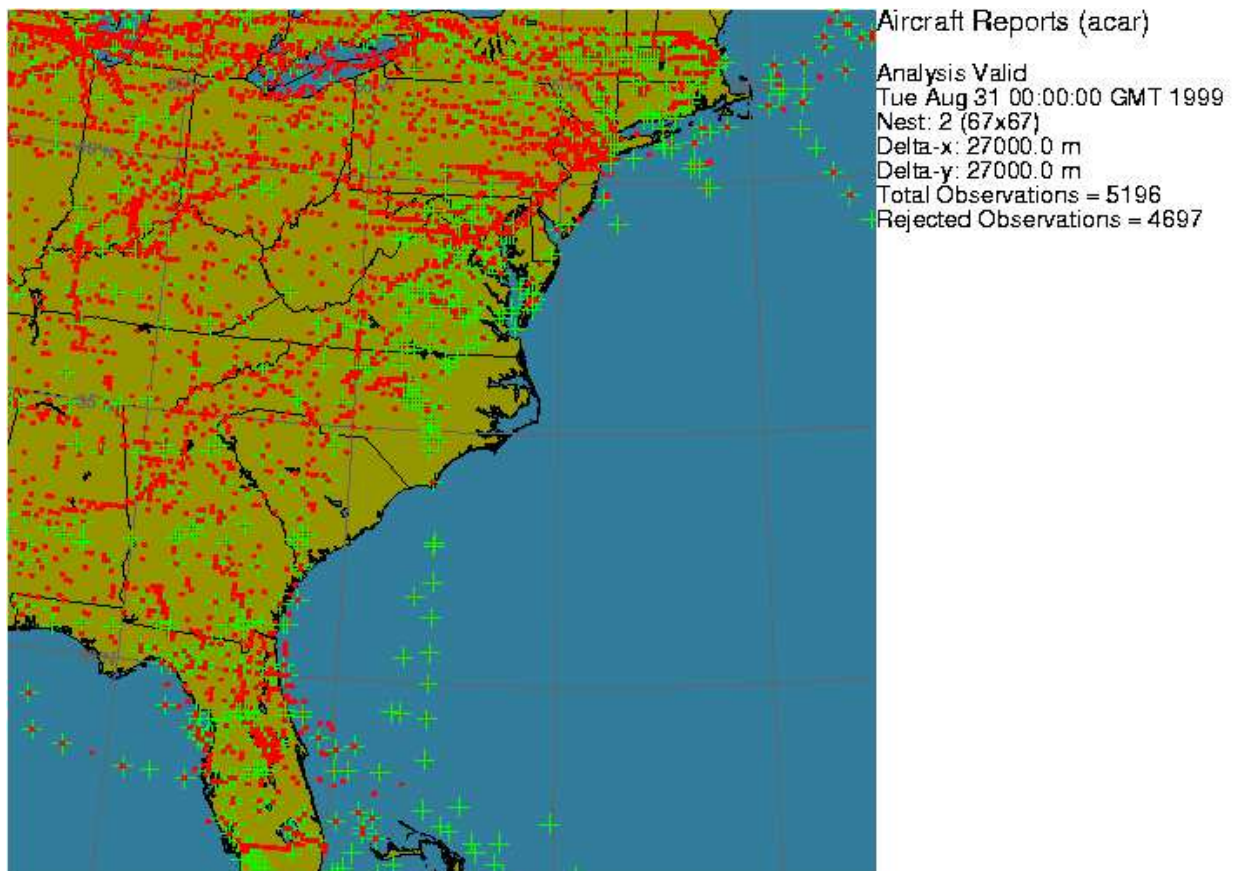
Figure 37. Aircraft reports for the 27km COAMPS™ nest.

Aircraft Reports (acar)

Analysis Valid
Tue Aug 31 00:00:00 GMT 1999
Nest: 3 (91x91)
Delta-x: 9000.0 m
Delta-y: 9000.0 m
Total Observations = 615
Rejected Observations = 443
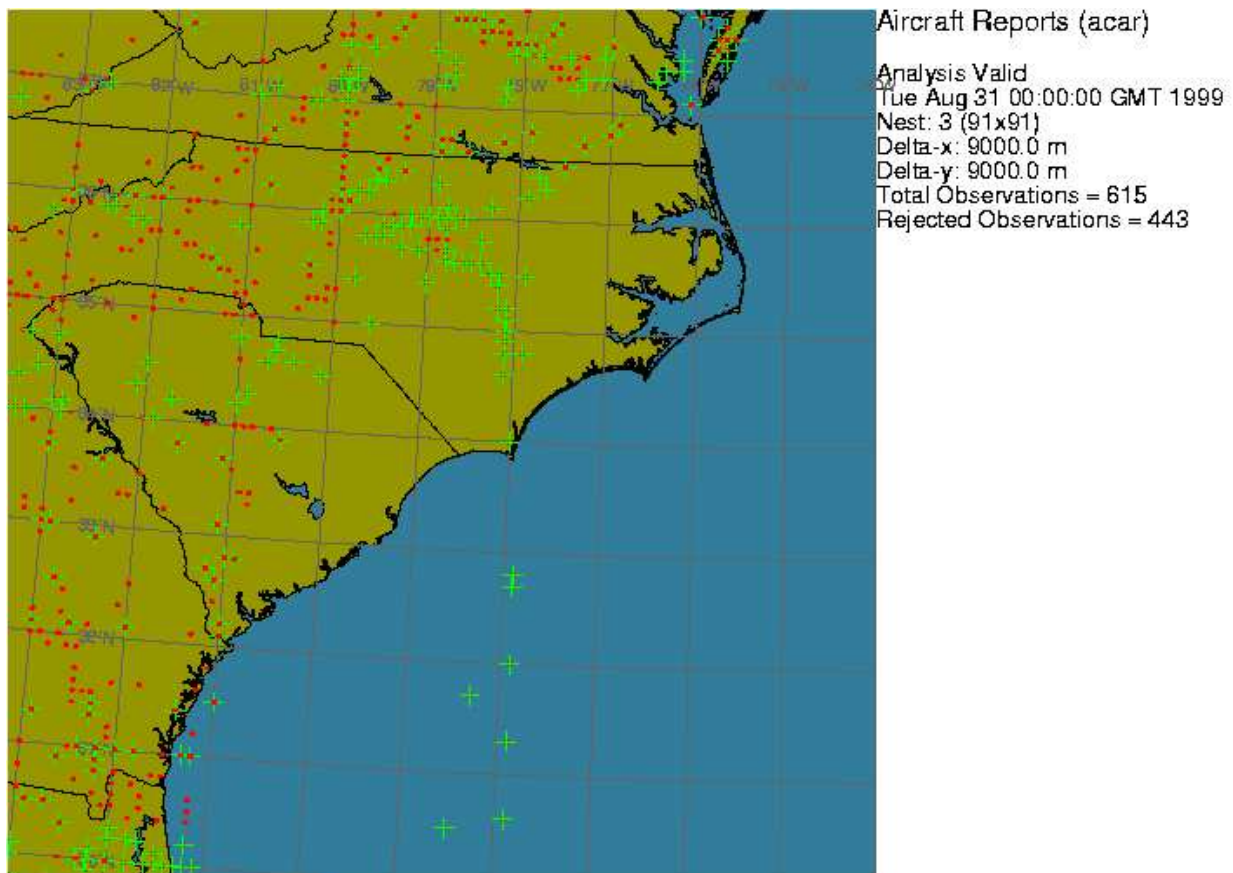
Figure 38. Aircraft reports for the 9km COAMPS™ nest.

Upper Air (raob)

Analysis Valid
Tue Aug 31 00:00:00 GMT 1999
Nest: 1 (72x45)
Delta-x: 81000.0 m
Delta-y: 81000.0 m
Total Observations = 117
Rejected Observations = 4
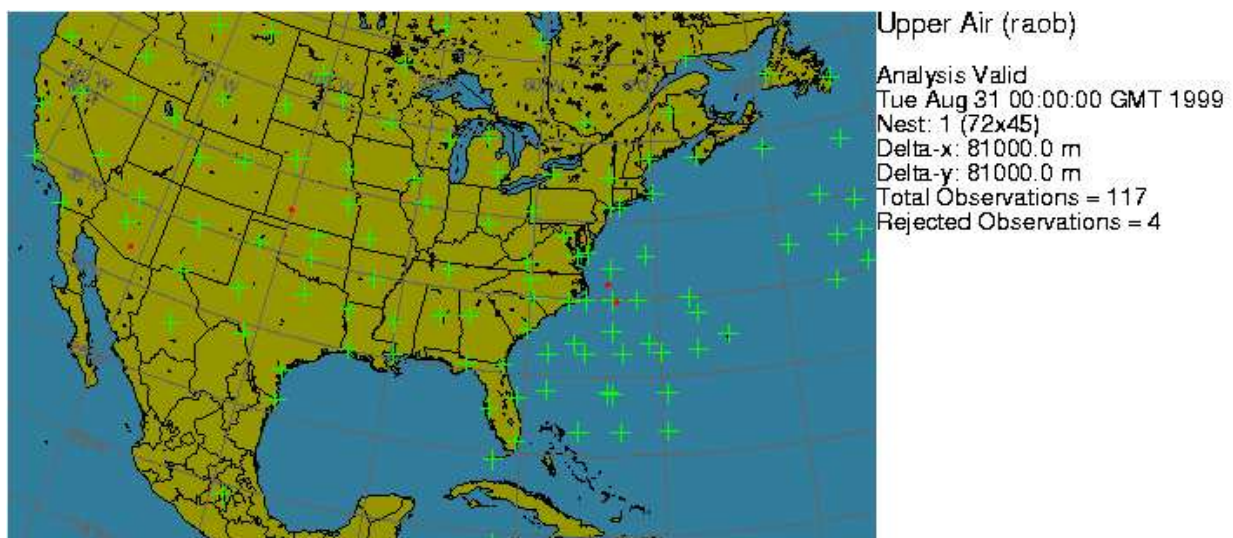
Figure 39. Upper air for the 81km COAMPS™ nest.
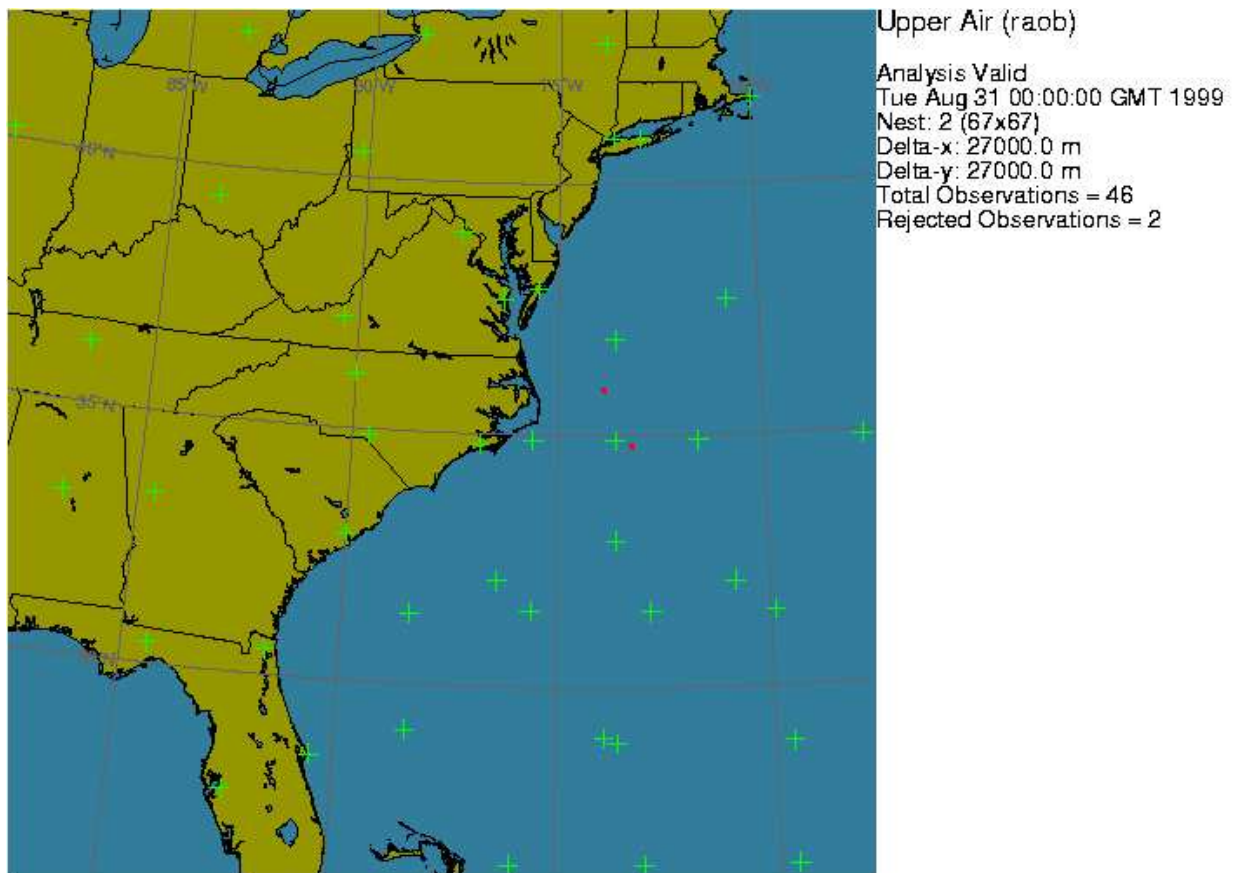
Figure 40. Upper air for the 27km COAMPS™ nest.
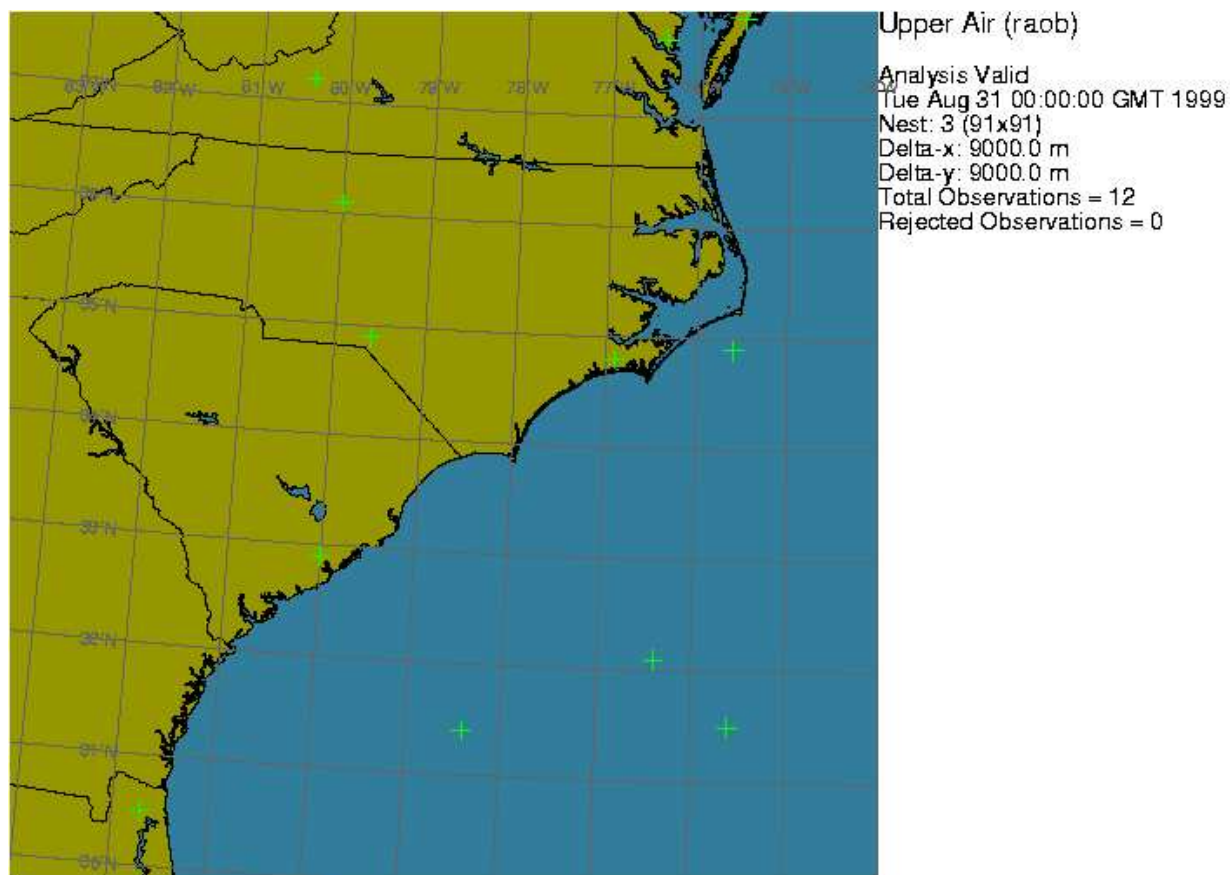
Figure 41. Upper air for the 9km COAMPS™ nest.

Table 4-3 summarizes the number of total and rejected observations for each product at each nest. Use the information to quantitatively verify the performance of the COAMPS™ analysis.

Table 4-3. Values for Example_Lambert 1999083100 Observation Values

Product	Nest	Total Observations	Rejected Observations
Aircraft Reports (acar)	1	13185	11062
Aircraft Reports (acar)	2	5196	4692
Aircraft Reports (acar)	3	615	443
Upper Air (raob)	1	117	4
Upper Air (raob)	2	46	2
Upper Air (raob)	3	12	0

13. Select **Meteogram** locations.

Figures 42 through 50 show examples of the **Meteogram** GUI and the three stations to select for the Example_Lambert project.
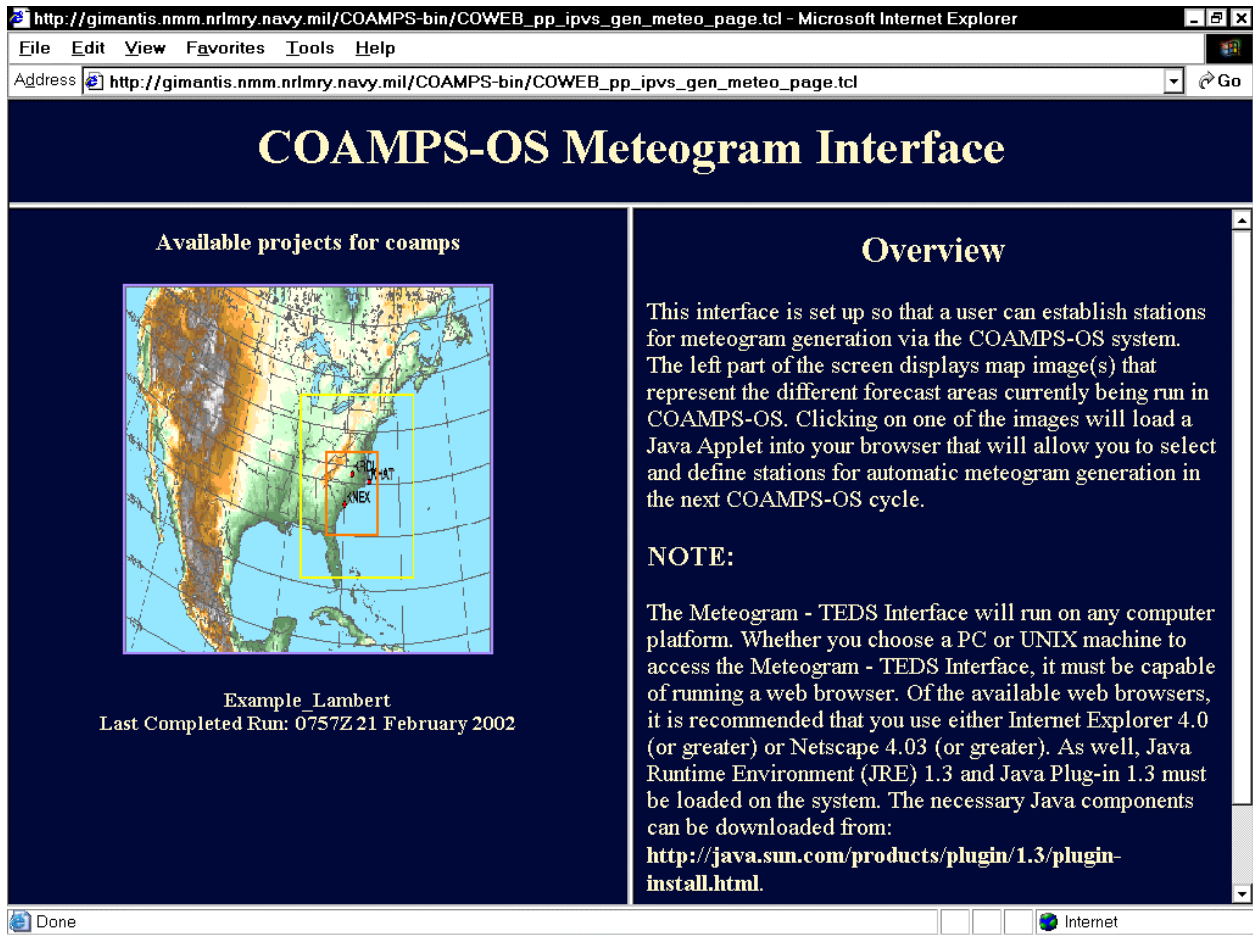
Figure 42. First step of the *Meteogram* GUI is to select an available project. Thumbnail images of available project areas are shown in the left frame. An overview of the *Meteogram* GUI is shown in the right frame.

Click on the map labeled Example_Lambert. If TEDS is available, the **Meteogram** GUI may require several seconds for the **Meteogram** GUI to initialize and display.
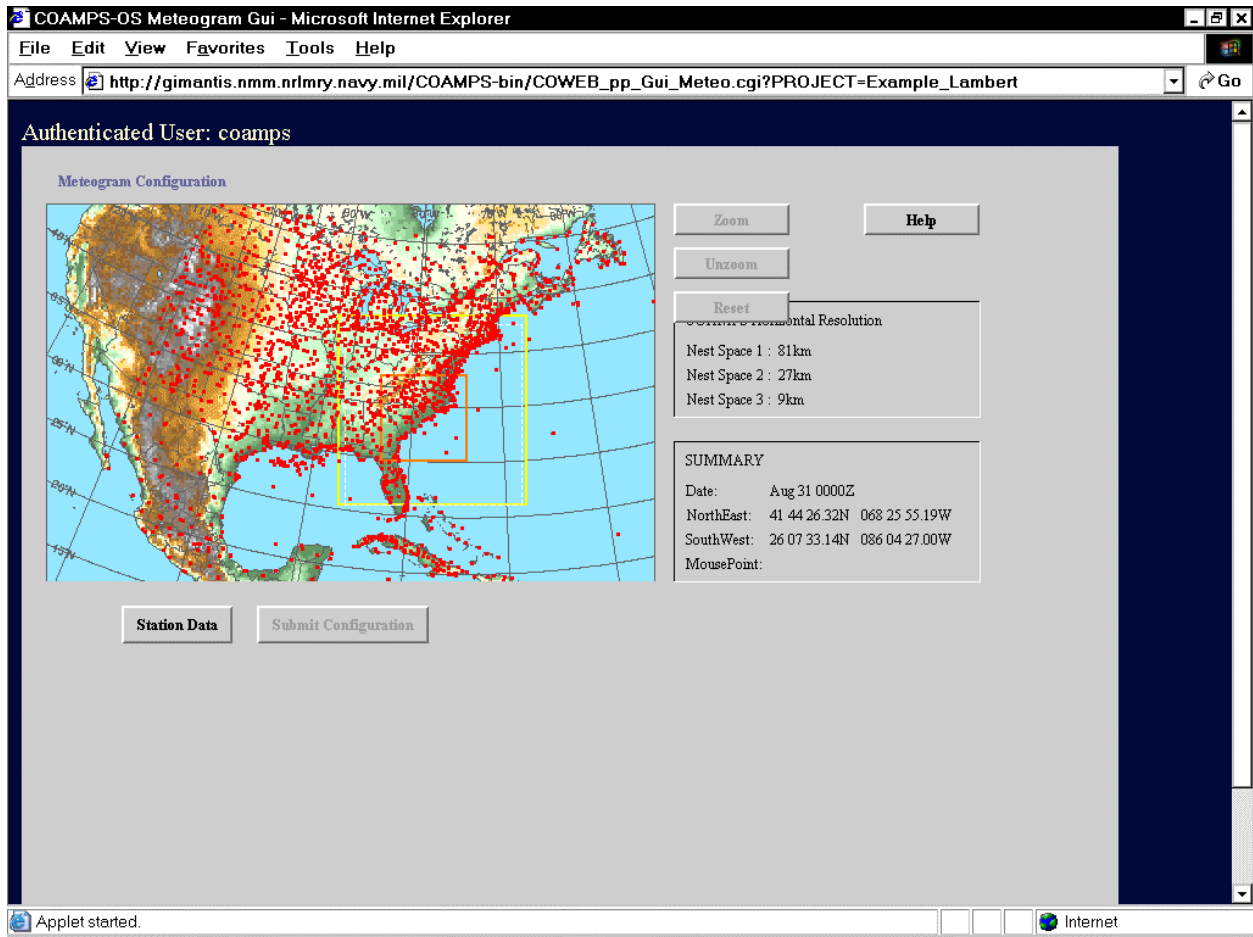
Figure 43. First view of the *Meteogram* GUI after applet has loaded. Stations, shown by red points on the map, will not be plotted if TEDS is not configured with the COAMPS-OS™ system.

Using the mouse, select an area off the East Coast as shown in Figure 44. A white dashed box will appear showing the selected area.
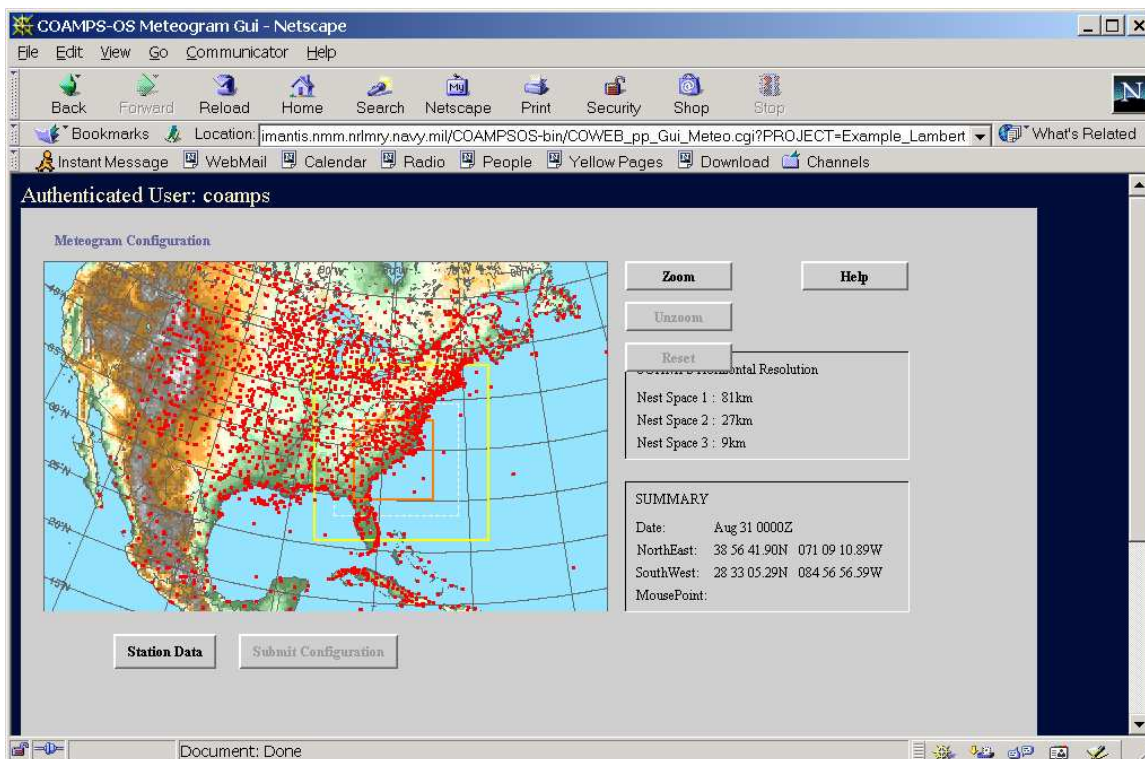
Figure 44. The user-selected area is shown by a white dashed box. The Station Data button is now enabled.

Click the **Station Data** button. A new window will appear (Figure 45) allowing the user to select available stations from TEDS (if applicable) and create new stations.
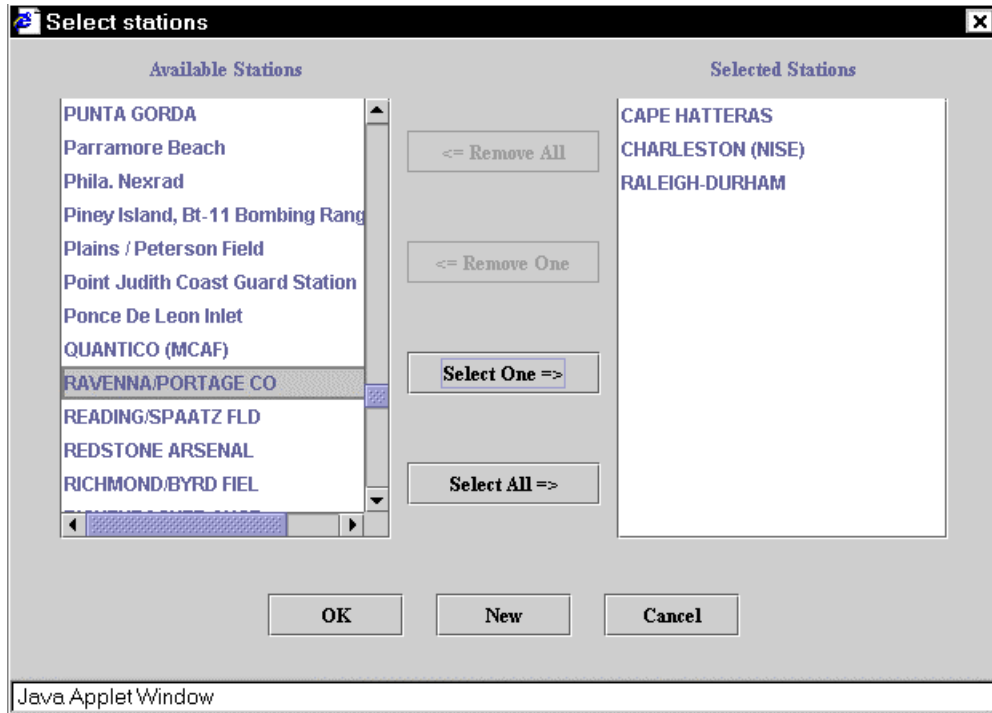
Figure 45. Select Station window.

Double click on the station name to view detailed station information. Cape Hatteras, Charleston, and Raleigh/Durham stations should be added to the list of **Selected Stations**. Figures 46 through 48 show the dialog windows that appear from double clicking on each of the selected stations. If TEDS is not available, click the **New** button in the **Select Stations** dialog. Enter the information for the stations listed in the Table 4-4.
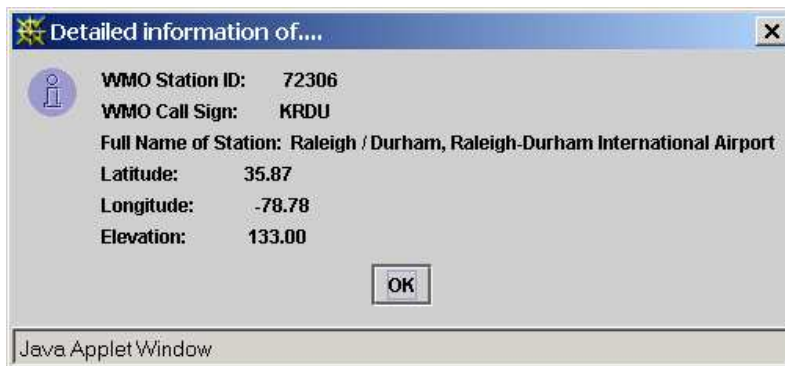
Figure 46. Station information for Raleigh/Durham, North Carolina.
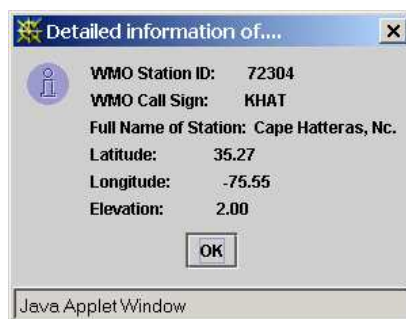
Figure 47. Station information for Cape Hatteras, North Carolina.

Figure 48. Station information for Charleston, South Carolina.

Table 4-4. **Meteogram** Stations for Configuration

Name of Station	WMO Call Sign	Latitude	Longitude	Elevation
Raleigh/Durham	KRDU	35.87	-78.78	133.00
Cape Hatteras	KHAT	35.27	-75.75	2.00
Charleston (NISE)	KNEX	32.92	-79.89	9.00

Figure 49 shows the updated map after selecting the stations. The available stations for the user-selected area are plotted in red and the selected stations are plotted in green.
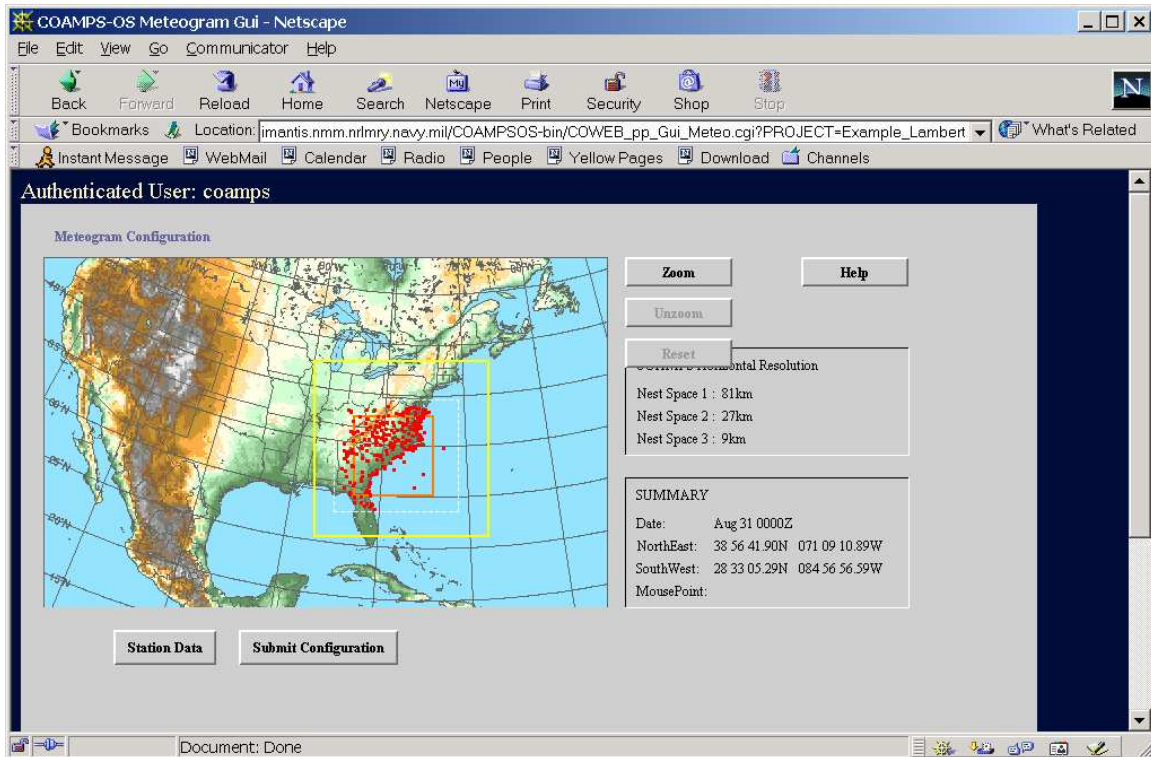
Figure 49. Stations plotted on the *Meteogram* GUI map. The *Submit Configuration* button becomes enabled after selecting stations.

Click the **Submit Configuration** button. A dialog window (Figure 50) will confirm the selected stations.
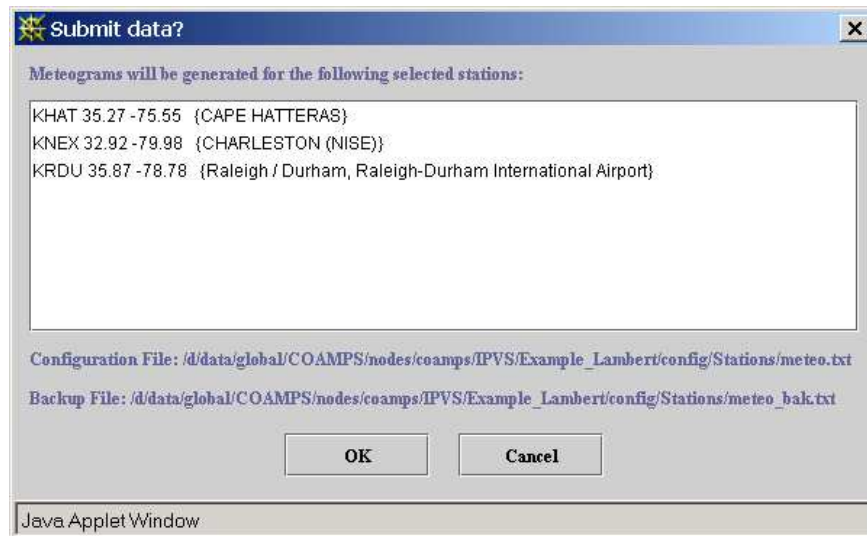
Figure 50. Station confirmation window. Station data will be written to the configuration file shown at the bottom of the window.

Click the **OK** button to save the selected stations to the **Meteogram** configuration file.

14. Run the 1999083012 datetime group following the same procedure as for the 1999083100 datetime group (steps 1 through 10).

15. After the COAMPS™ model and post-processing are complete, access the **Meteograms** by clicking on the links located at the bottom of the IPVS Forecast page (Figure 51).

Figures 52 through 57 show the **Meteograms** that will be generated for the Example_Lambert 1999083112 datetime group. Note that **Meteograms** are only generated for the innermost COAMPS™ nest.
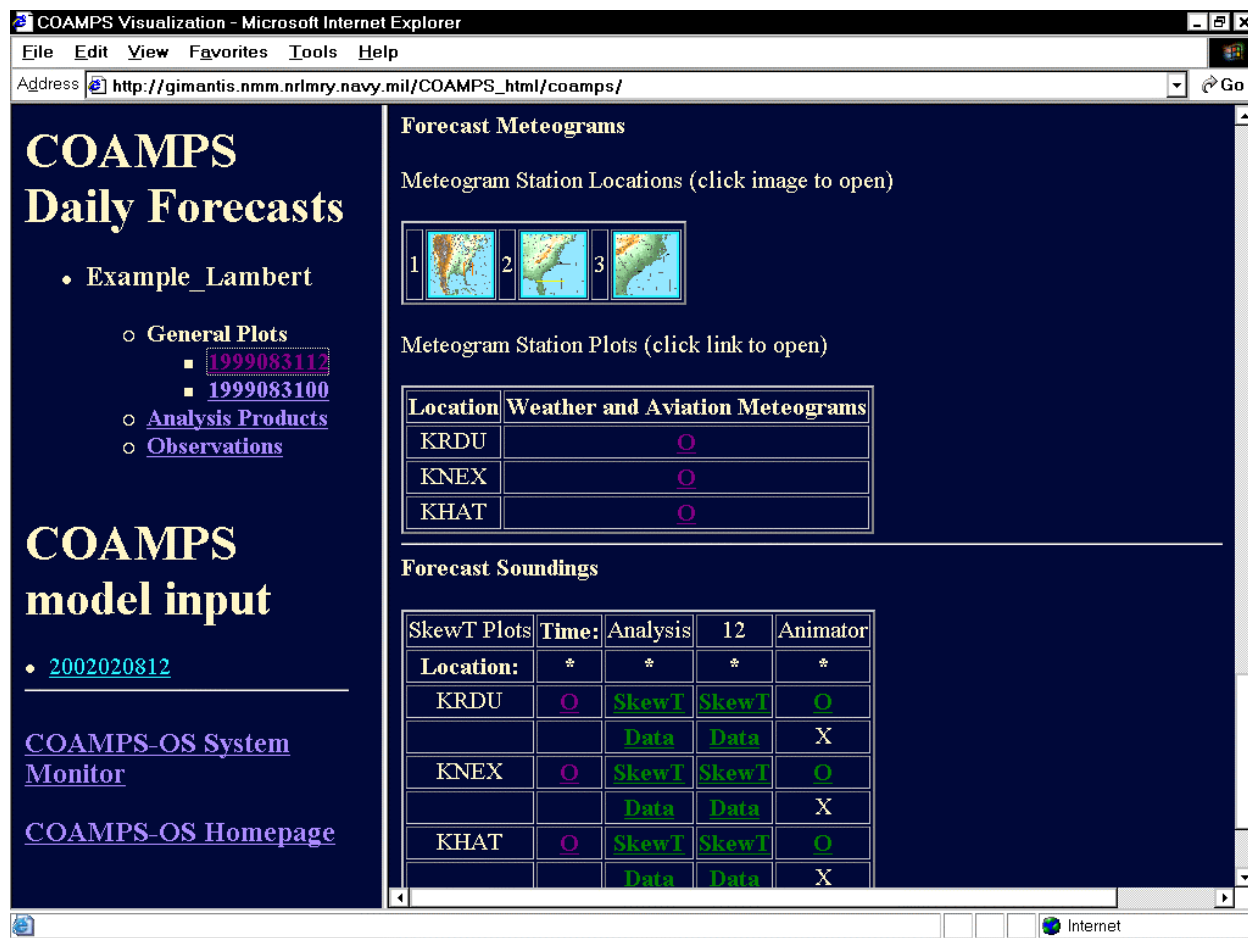
Figure 51. Available *Meteogram* and SkewT plots for the 1999083112 datetime group.
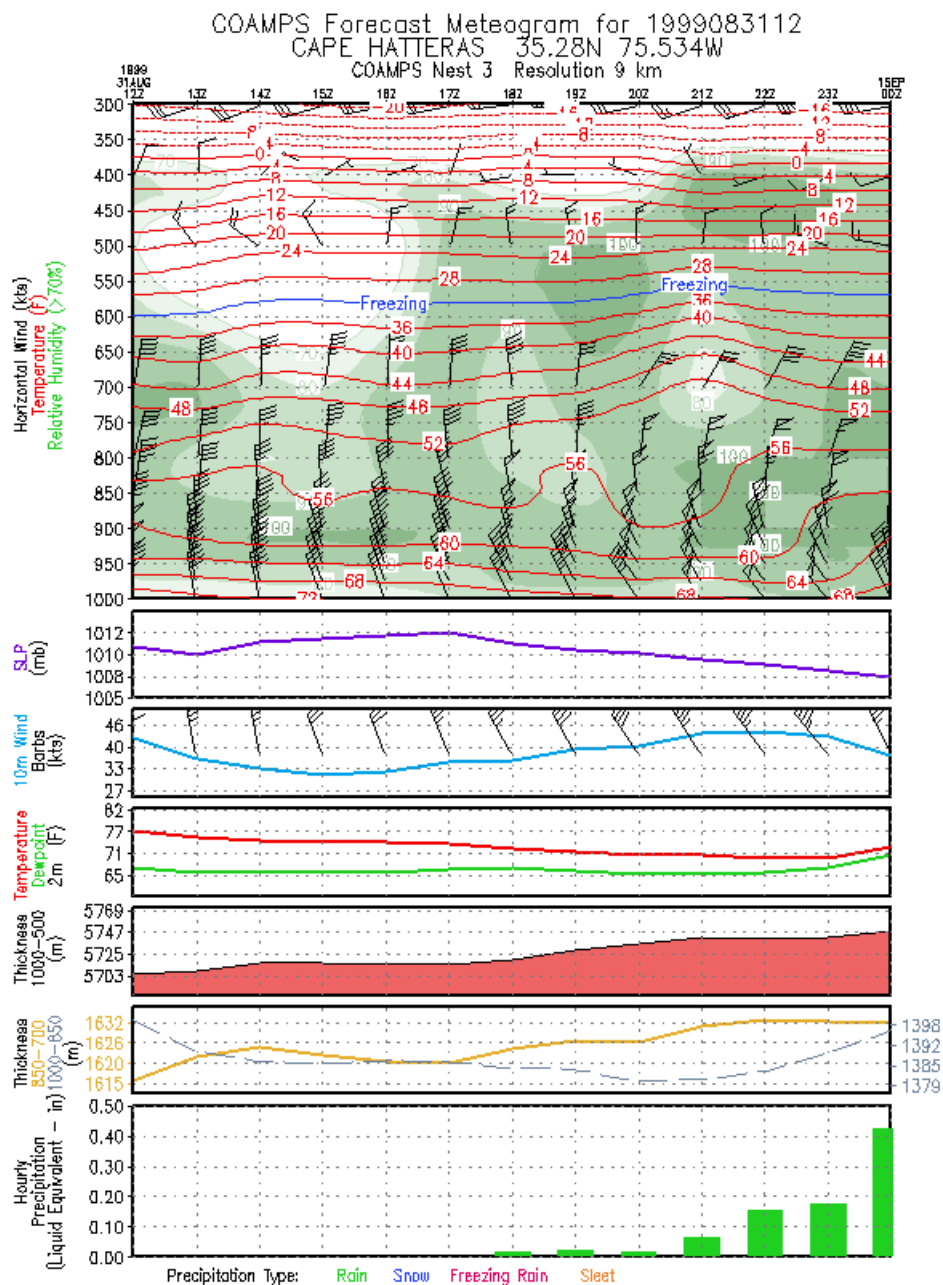
Figure 52. Cape Hatteras, North Carolina *Meteogram*.
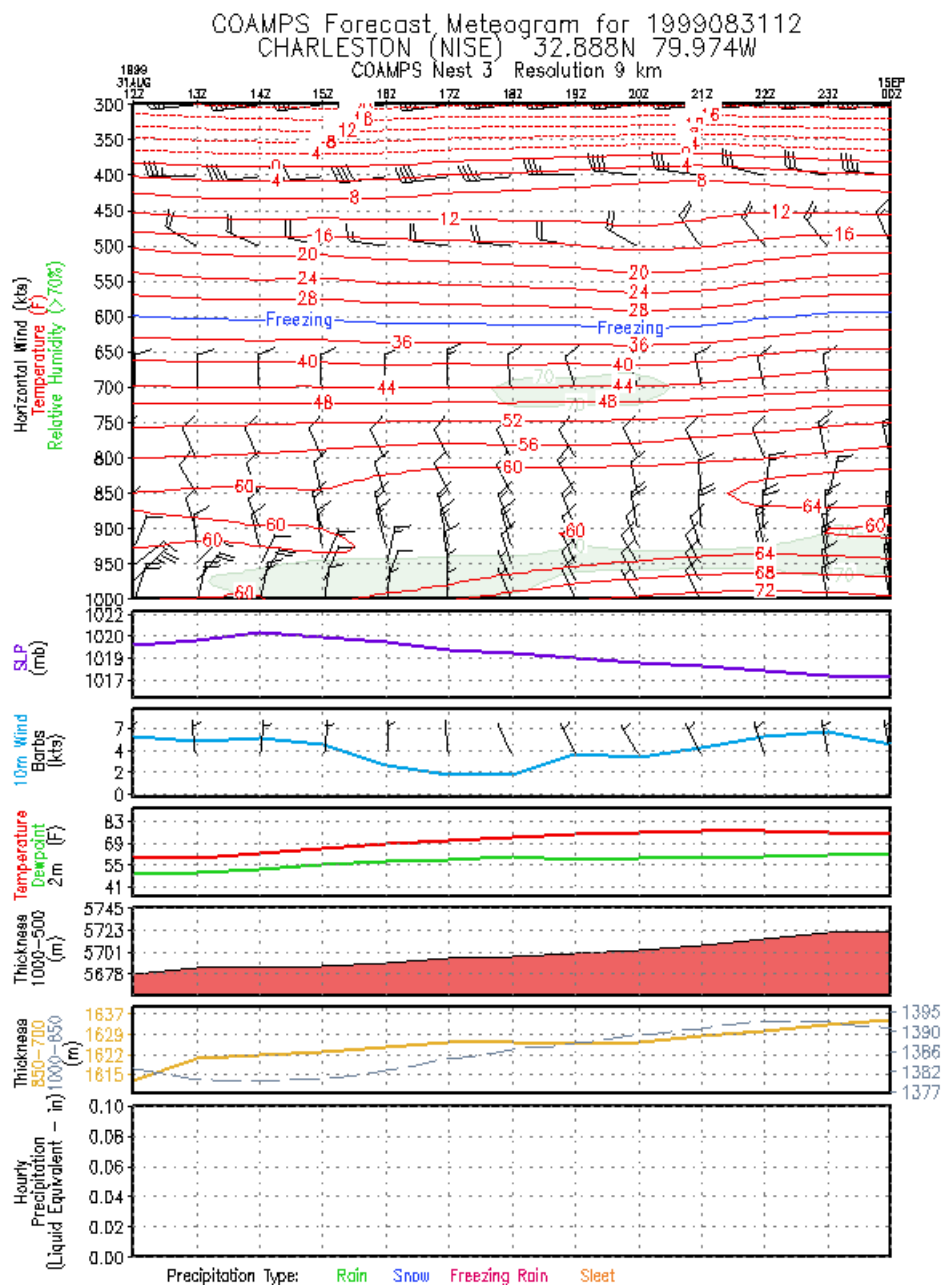
Figure 53. Charleston, South Carolina *Meteogram*.
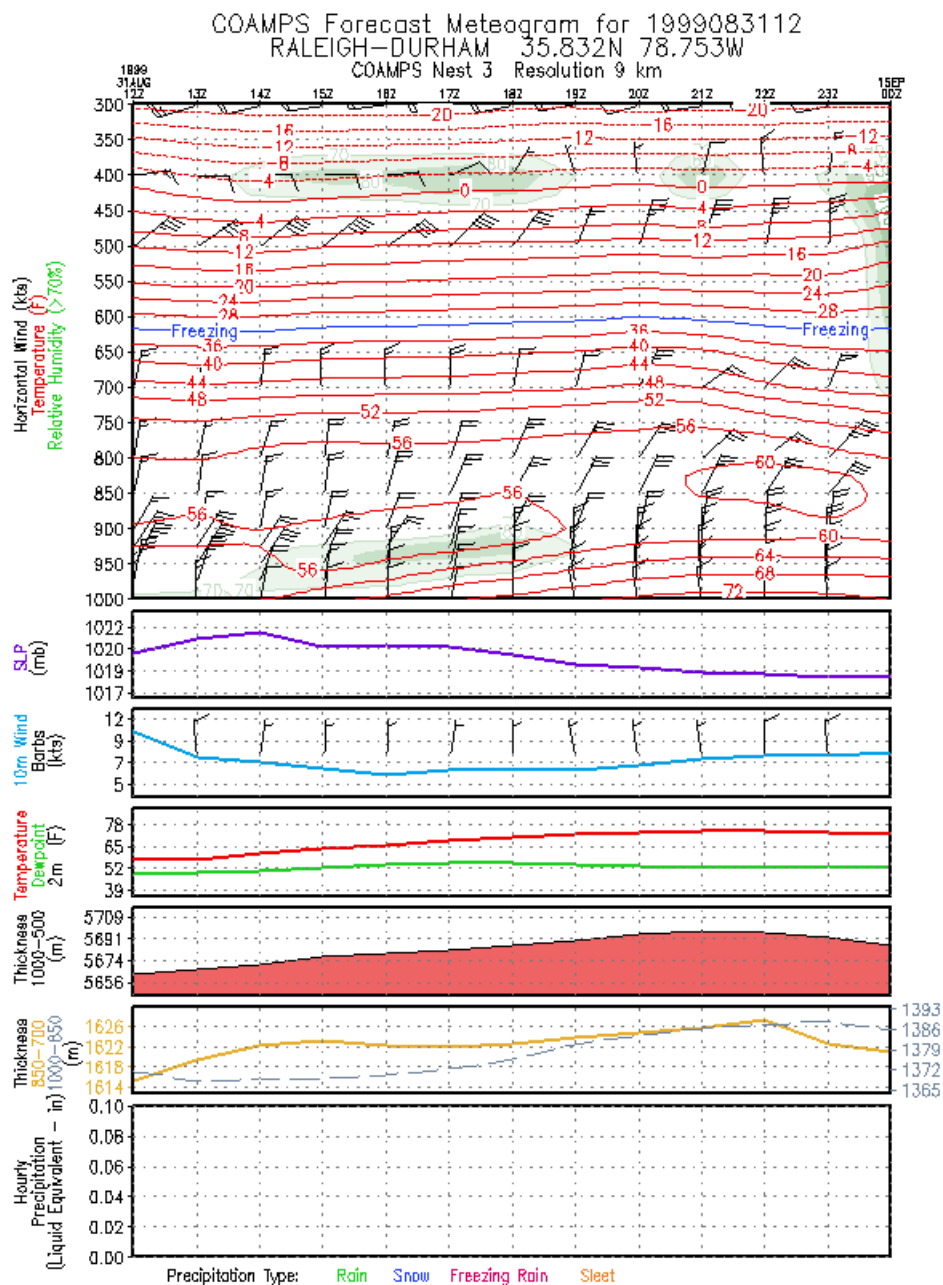
Figure 54. Raleigh-Durham, North Carolina *Meteogram*.
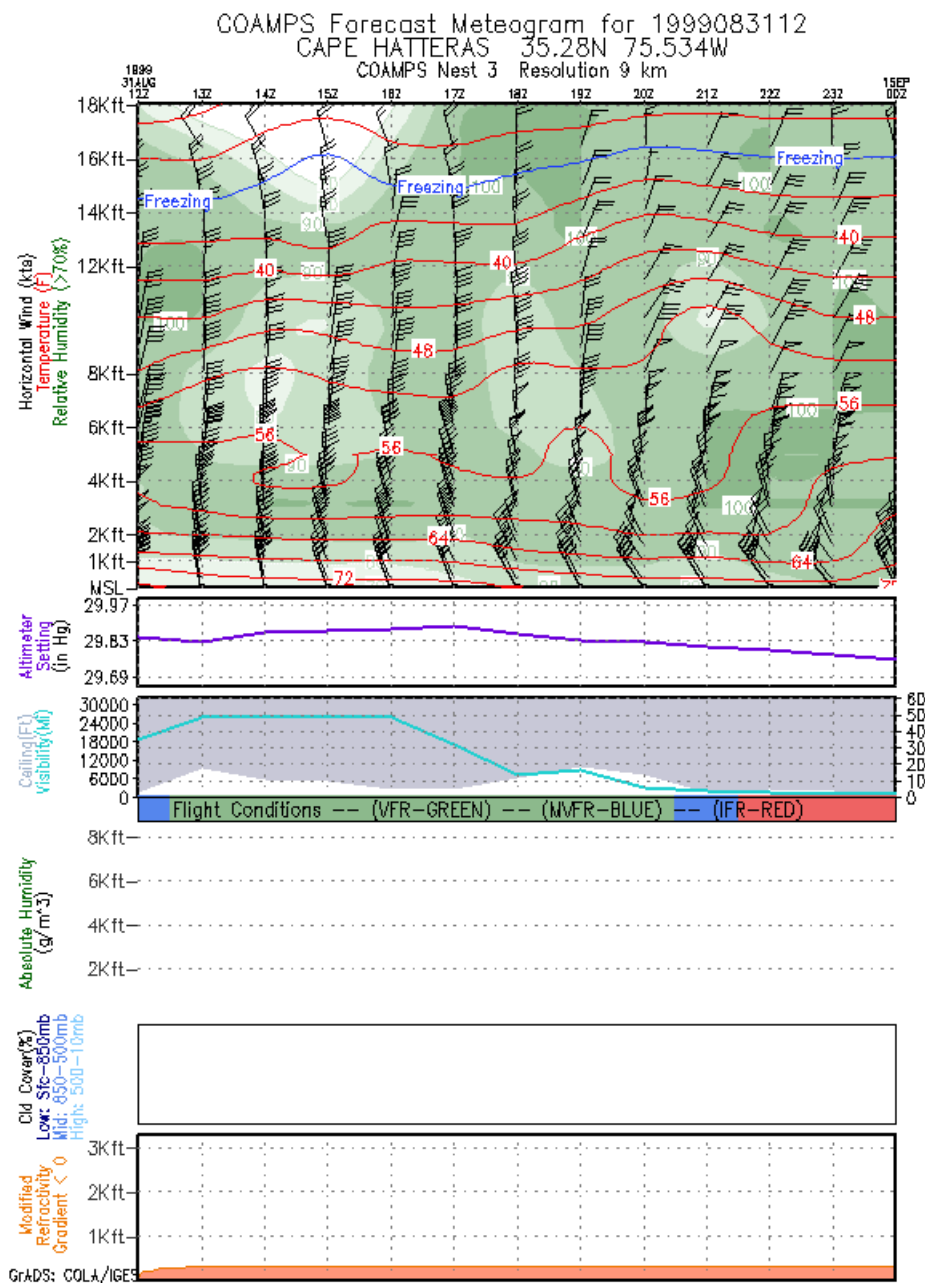
Figure 55. Cape Hatteras, North Carolina height surface *Meteogram*.
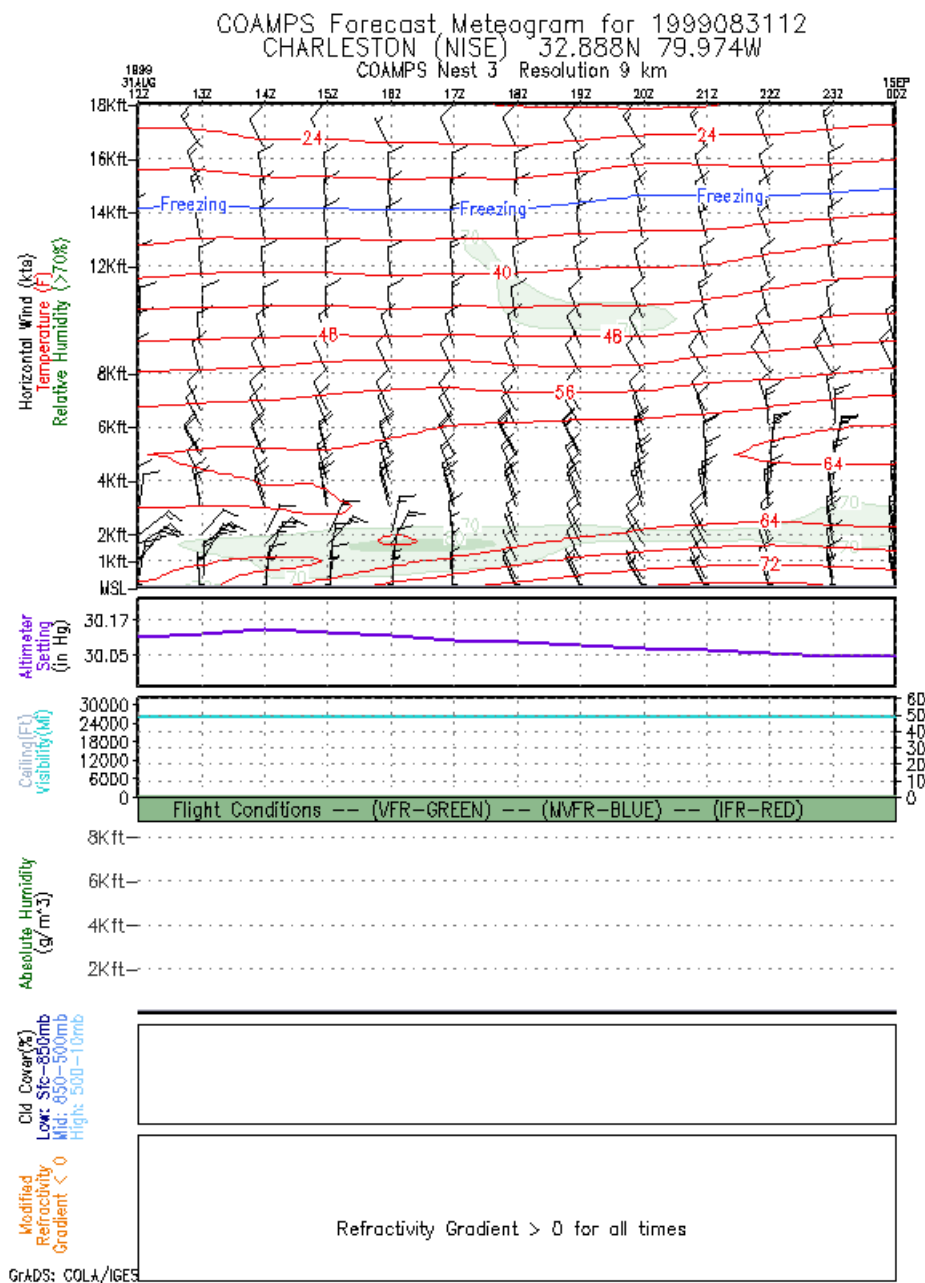
Figure 56. Charleston, South Carolina height surface *Meteogram*.
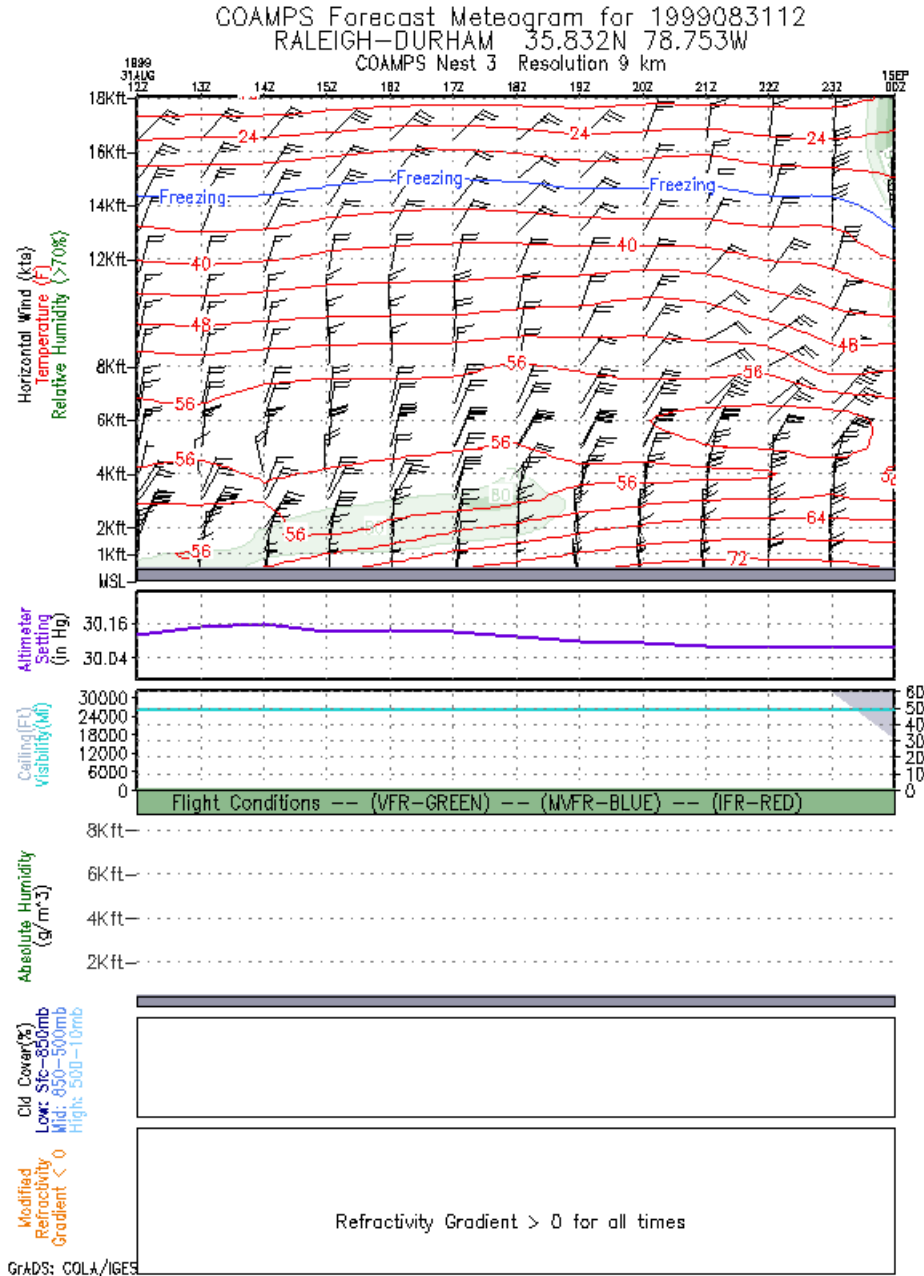
Figure 57. Raleigh-Durham, North Carolina height surface *Meteogram*.

16. View the Skew-T plots for the Example_Lambert 1999083112 datetime group.

Skew-T plots are accessed from the bottom of the Forecast page, beneath the links to the **Meteograms**. Figures 58 through 63 depict the Skew-T plots generated for the 1999083112 datetime group of the Example_Lambert project. Datagrams that correspond to each image are provided in Appendix A.
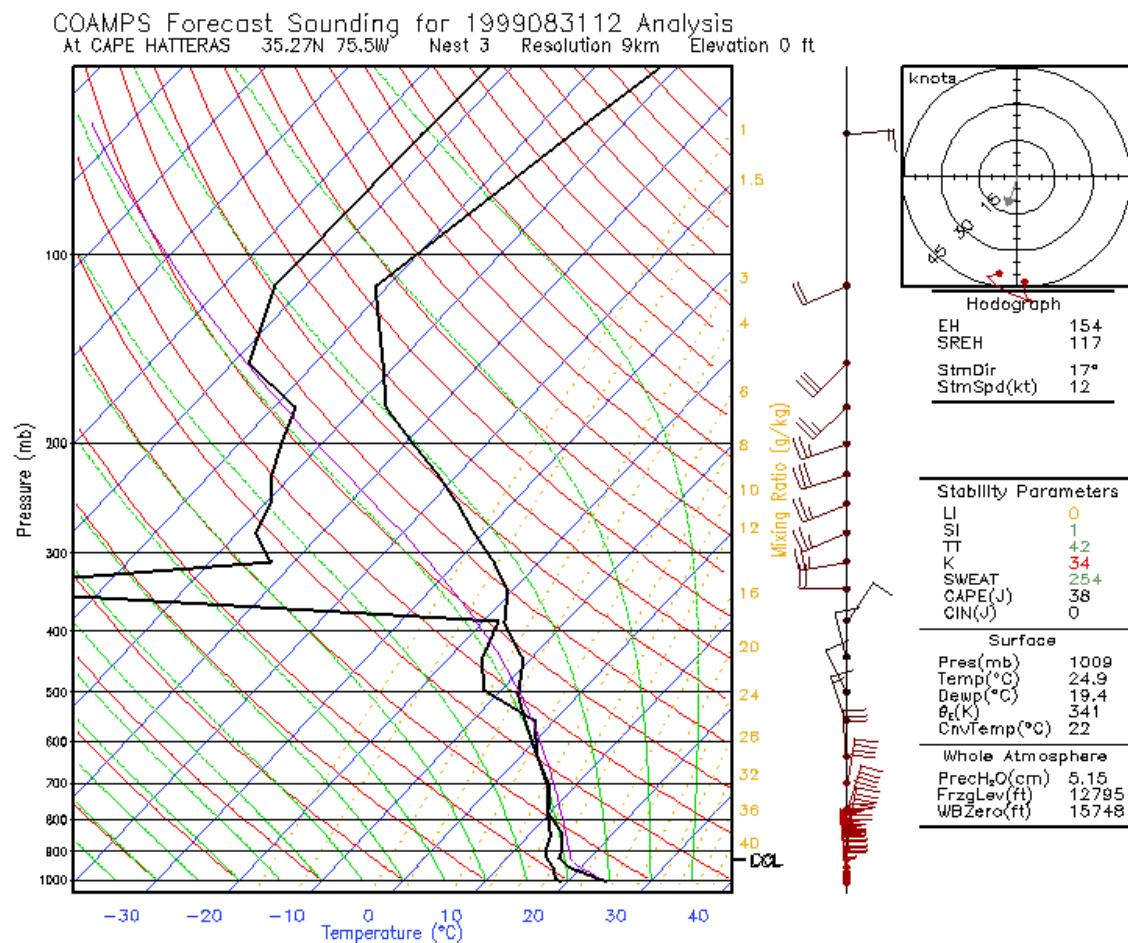
Figure 58.   Forecast sounding at Cape Hatteras, North Carolina for the 1999083112 analysis.
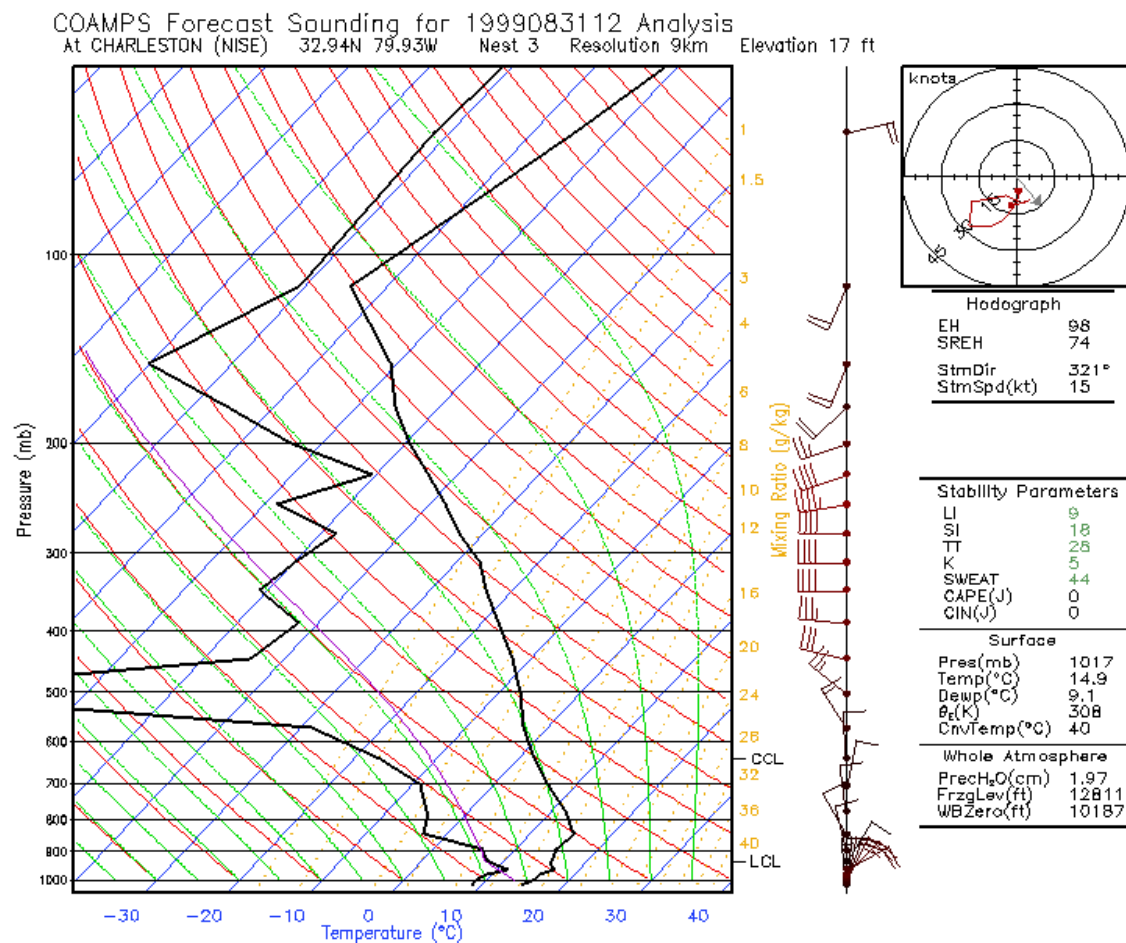
Figure 59. Forecast sounding at Charleston, South Carolina for the 1999083112 analysis.
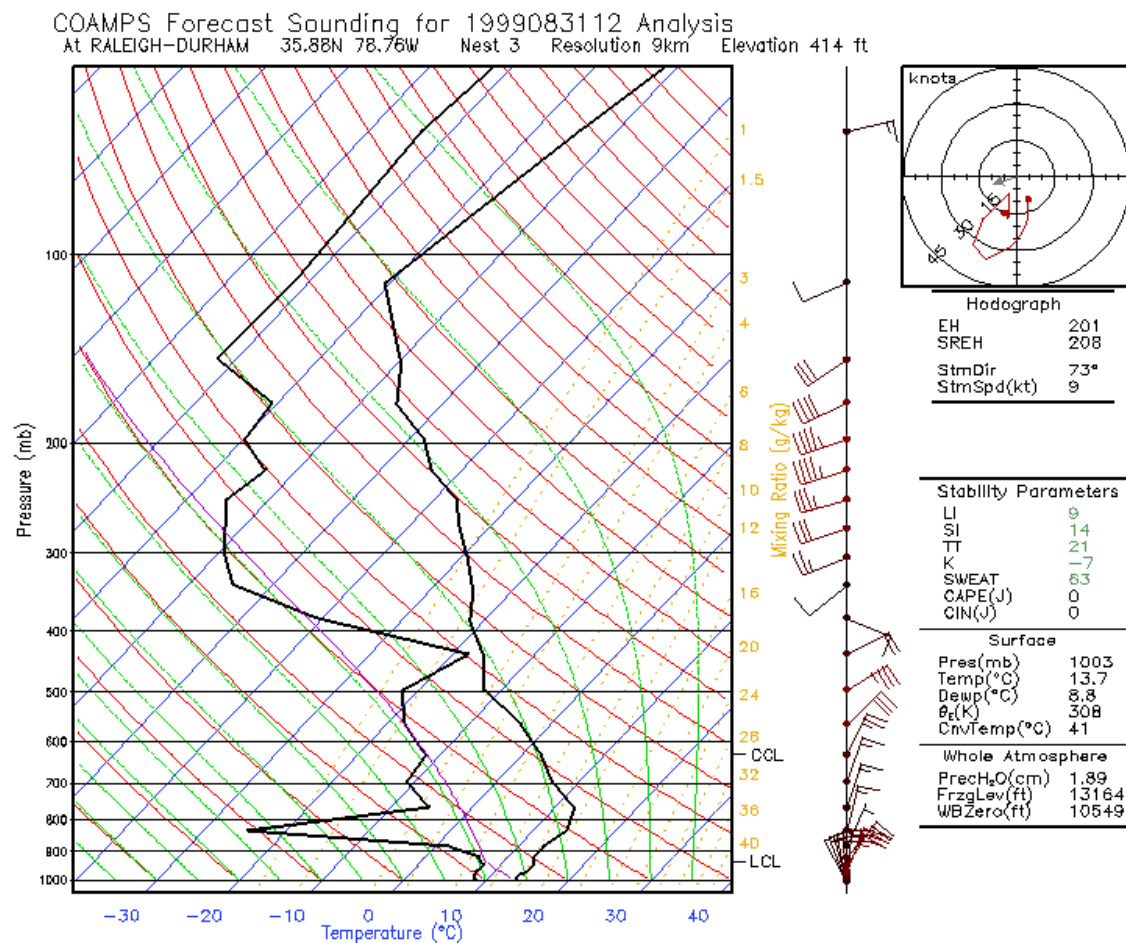
Figure 60. **Forecast sounding at Raleigh-Durham, North Carolina for the 1999083112 analysis.**
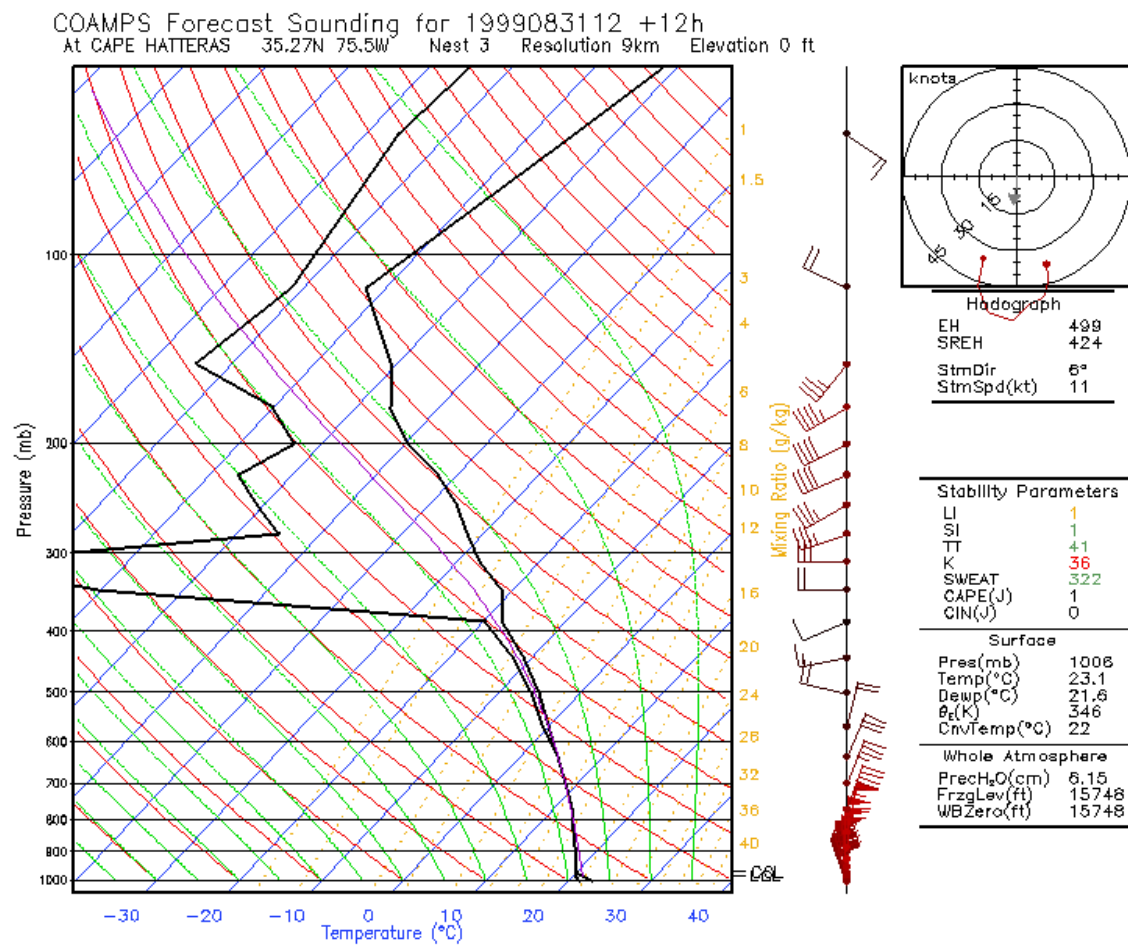
Figure 61. Forecast sounding at Cape Hatteras, North Carolina for tau 12.
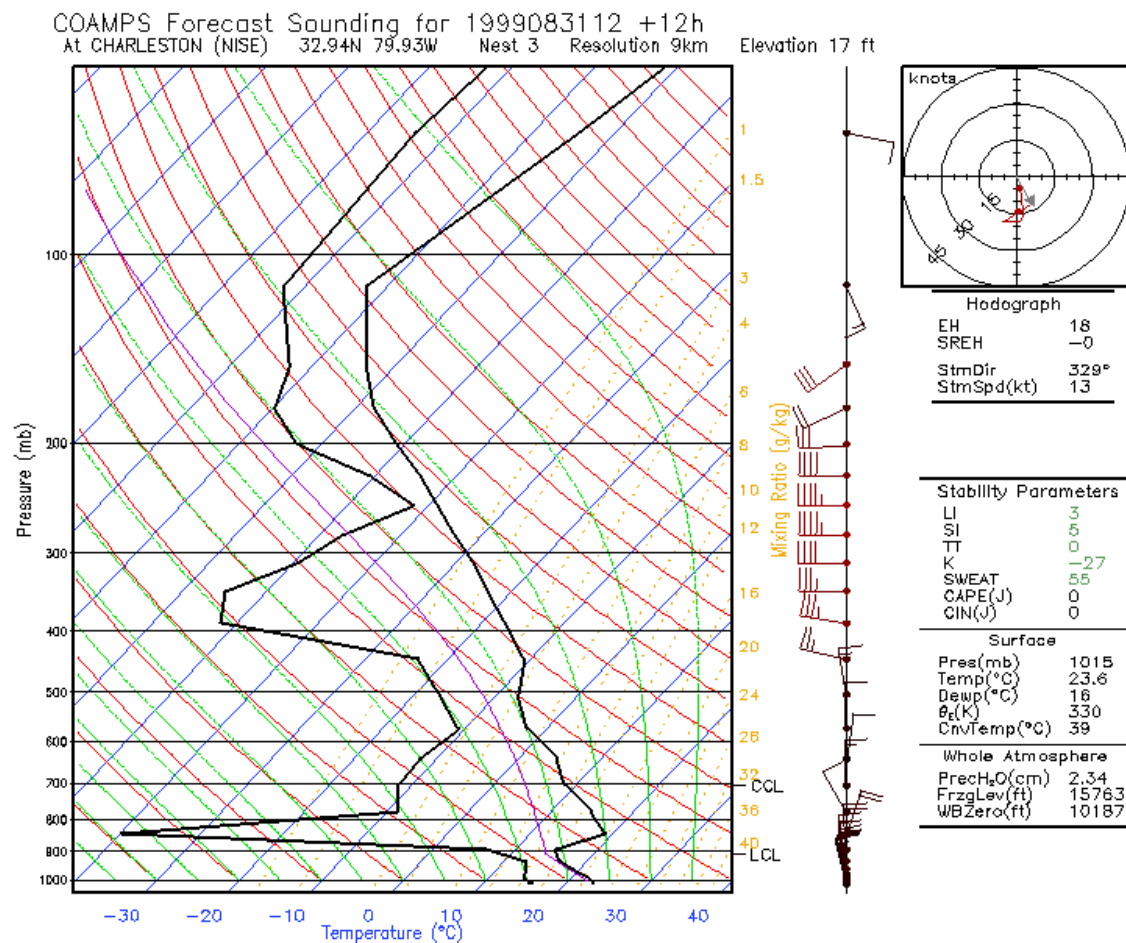
Figure 62. Forecast sounding at Charleston, South Carolina for tau 12.
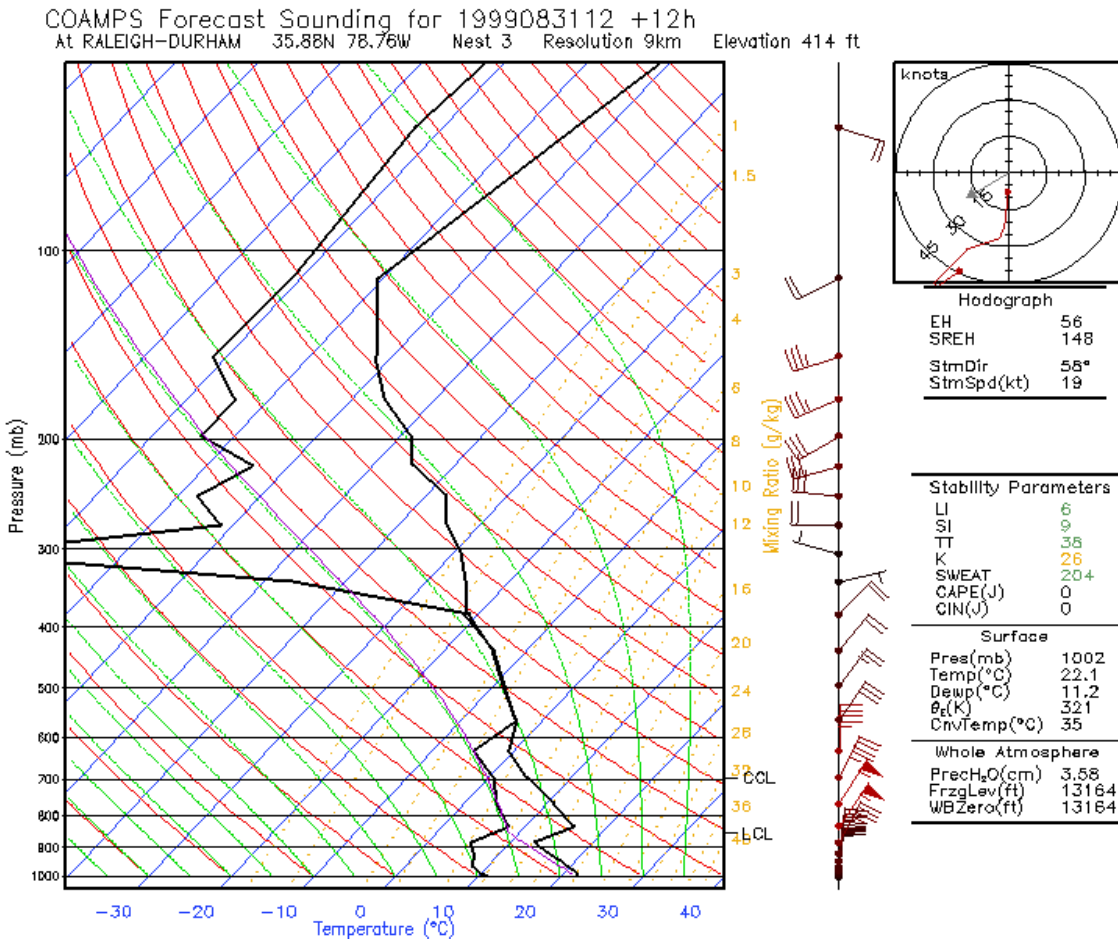
Figure 63. Forecast sounding at Raleigh-Durham, North Carolina for tau 12.

4.1.1.4 Expected Test Results

The expected test results for each test case are shown in the figures in Section 4.1.1.3 and the datagrams in Appendix A. Each figure demonstrates the results of each test case through the COAMPS-OS™ visualization products. Tables 4-2 and 4-3 reinforce the graphics displayed in the figures. The tables are provided for convenience to verify the test results.

4.1.1.5 Criteria for Evaluating Results

1. Acceptable input and output conditions: The output should be similar to the data listed in Tables 4-2 and 4-3 and shown in Figures 26 through 34, 36 through 41, and 52 through 63. Because of differences in computer architecture and precision, numerical differences due to round-off can occur in floating point calculations and are considered acceptable for the levels specified below.
2. Acceptable output range or accuracy: one percent difference from expected values. Calculate the percent difference with the following equation:
   ```
   (|actual value - expected value|/ expected value)*100.
   ```
3. Allowable errors and severity of errors allowed: All products described in the test must be generated.

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4. Minimum/maximum allowable test duration (in time or events): Approximately two and a half hours to run the COAMPS-OS™ Example_Lambert project.
5. Maximum number of interrupts, halts, or other system breaks: None
6. Conditions for interpreting outputs: A degree in meteorology or equivalent experience.
7. Conditions for re-testing: A missing product. Before re-running the test, troubleshoot the problem according to details provided in Section 4.1.1.6.

4.1.1.6 Test Evaluation

After the installation procedure has completed and the sample COAMPS™ forecast has executed with a sample dataset, use the items listed in the following sections to verify the test is successful. Evaluate each module of COAMPS-OS™ according to the following items listed in each section: action, expected response, possible problem, and solution.

A. COAMPS™ Model
The COAMPS™ model is verified by a successful run of the Example_Lambert project described in Section 4.

B. GUI (COAMPS-OS™ and Meteogram)

Perform the following steps to test the functionality of the COAMPS-OS^{TM} GUI.

1. Check the initial appearance of the Map Panel (Figure 4).

Action: Open the COAMPS-OS™ GUI in a web browser.
Expected Response: The COAMPS-OS™ GUI will load with a map of the world in the upper right hand side.
Possible Problem: No map of the world.
Solution: The applet requires two files, COWEB_global180.gif and COWEB_global0.gif. The files should be located in the directory,

/h/data/global/COWEB/pub/html/images.

The missing files are not fatal to the operation of the GUI. However, the user will be restricted to reading previously saved project files until the global map images are available to the applet. Contact NRL if the problem persists.

2. Check for example projects in the COAMPS-OS GUI™.

Action: Open the COAMPS-OS™ GUI in a web browser.
Expected Response: The COAMPS-OS™ GUI will load with a list of available projects in the "Main" panel. The projects include Example_Mercator, Example_Polar, and Example_Lambert.
Possible Problem: If the "Project Files" list box appears empty, click the "Reload Projects" button in the "Main" panel to initiate a call to load the available project files. If the "Reload Projects" button fails to load projects into the list box, the example project files are not available.
Solution: The example projects are automatically copied to the directory of each new authenticated user accessing the COAMPS-OS™ GUI. Failure to copy the files indicates a problem with the COAMPS-OS™ software. Contact NRL to report the incident.

3. Check for available fields (Figure 64) in the Output Panel of the COAMPS-OS™ GUI.

Action: Open the COAMPS-OS™ GUI in a web browser and click the "Output" tab.
Expected Response: The list boxes of the Output panel should be filled with available parameters for pressure, height surface, and surface levels.
Possible Problem: The list boxes are empty.
Solution: The list boxes are initialized using information contained within the following file,

/h/data/global/COAMPS/nodes/OcardNameList.ini.

The OcardNameList.ini file must be available for the COAMPS-OS™ GUI to execute properly. Contact NRL if the file is missing, or the list boxes are empty despite the availablility of the OcardNameList.ini file.
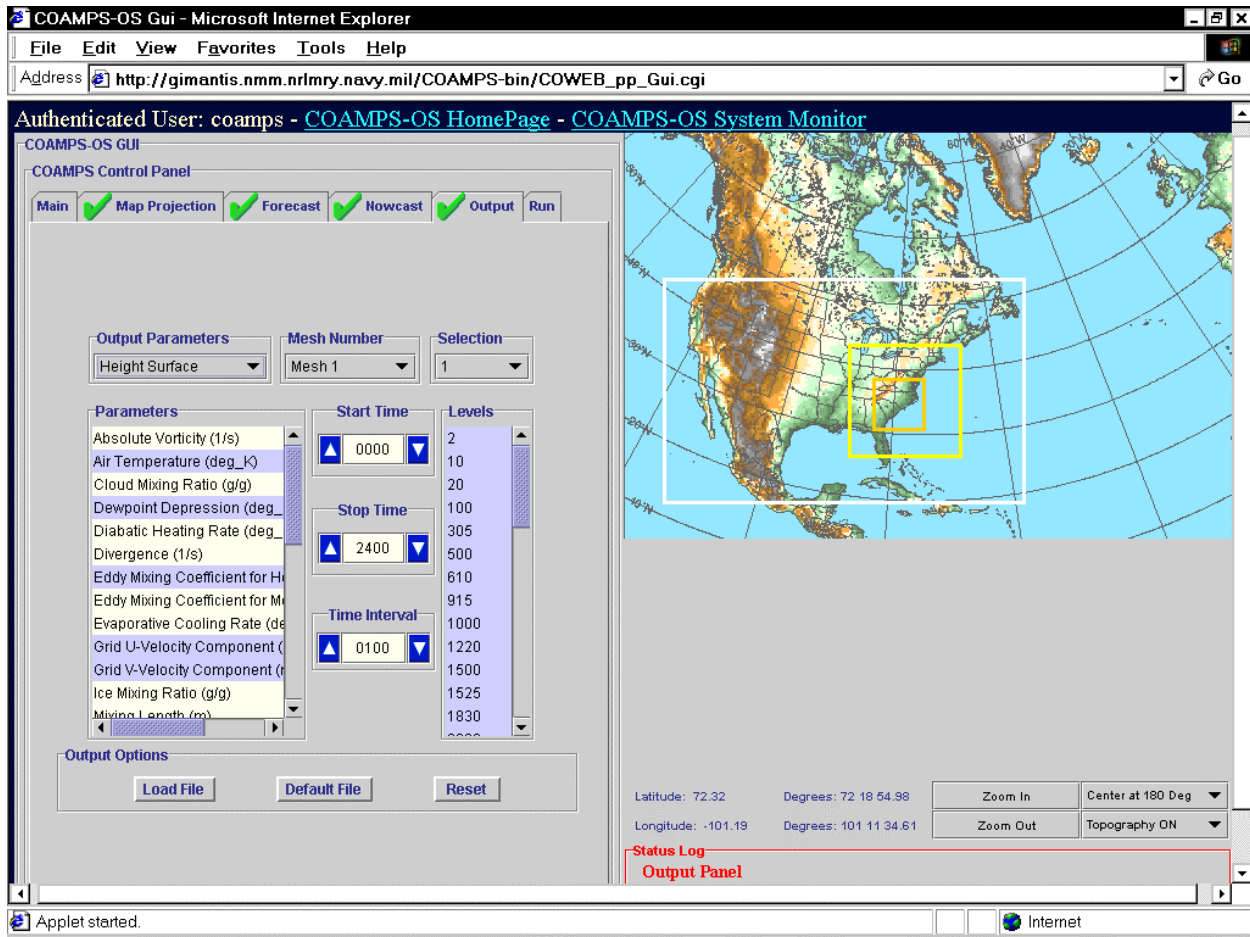
Figure 64. Available output parameters can be configured in the Output panel.

4. Check for available datetime groups.

Action: Open the COAMPS-OS™ GUI in a web browser and select the "Run" tab.
Expected Response: The "COAMPS Start Time – NOGAPS Base Time" list box of the "Run" Panel contains available datetime groups (DTG) for running COAMPS.
Possible Problem: The "COAMPS Start Time – NOGAPS Base Time" list box is empty.
Solution: Confirm the network connectivity between the workstation running the web browser and the COAMPS™ server. If the network is down, information for available datetime groups will be inaccessible.
Possible Problem: The "COAMPS Start Time – NOGAPS Base Time" list box contains a single entry called "current-dtg".
Solution: If a single entry of "current-dtg" appears in the list box, the data directory for NOGAPS files does not contain a complete set of data to run COAMPS. Confirm the retrieval capabilities described in the "Data Retrieval" subsection of 4.1.1.6.

5. Confirm the initial values for directory locations.

Action: Open the COAMPS-OS™ GUI and select the Applications Preferences tab.
Expected Response: Each entry in the Application Preferences panel should have a default directory location defined.
Possible Problem: A directory location has not been defined.
Solution: Report the incident to NRL.

6. Verify the functionality of the batch queue.

Action: In the "Batch" control panel accessible from the "Run" panel, select one of the functions, "Add to Batch Queue", "Edit Batch Queue", or "Remove from Batch Queue".
Expected Response: The user may add, edit, or remove any project from the batch queue.
Possible Problem: An error message is written to the "Status Log" indicating a system problem, or the action specified does not successfully complete.
Solution: The coamps user on the COAMPS server must have privileges to add or remove entries from the cron table. Confirm the status of the cron daemon with the system administrator of the COAMPS server. If the coamps user has the necessary privileges to edit the cron table, and the user cannot edit the batch queue, contact NRL and report the incident.

7. Confirm projects are read properly from the COAMPS-OS™ GUI.

Action: From the Main panel, select "Read Project".
Expected Response: All panels are updated with the saved values for the selected project. Each panel should display a green check.
Possible Problem: An error occurs while reading in the project, or the values for each panel do not correspond to the saved values.
Solution 1: Try rereading the project by selecting "Read Project". Network distruptions may prevent the GUI from reading all configuration settings for a project.
Solution 2: If Solution 1 does not resolve the problem, the user may try to individually load each component of a saved the project. The user should proceed by selecting "Load File" in each panel and select a project. If the configuration settings for a single panel cannot be read, the user will have to reselect the parameters for the panel. If the GUI is unable to read any configuration settings for any project, contact NRL for assistance.

8. Confirm zoom functionality of the COAMPS-OS™ GUI.

Action: Single click in the map display panel, or select an area in the map and click a Zoom option.
Expected Response: A new map will appear in the display.
Possible Problem: No map appears or the map returns to the initial world map.
Solution: Periodic network distruptions may prevent communication between the web browser and COAMPS-OS™ server. Try to perform the zoom function again.
Possible Problem: A map is returned for the wrong area.
Solution: Document the steps taken prior to performing the zoom function. Report the incident to NRL.

Data Retrieval (NOGAPS, Observations, Ocean, and COAMPS™)

NOGAPS

1. Verify NOGAPS grids have been retrieved and written to the COAMPS server.

Action: Access the "Available NOGAPS" link from the Remote Monitor page.
Expected Response: The link displays a table with multiple datetime groups listed under the "COAMPS Run" column. The listing of datetime groups is produced from files available in the /h/data/local/COAMPS/nogaps directory on the COAMPS server. Filenames in the directory are 32 characters in length (e.g. slpra1200107270006000000000000000sll). Each datetime group includes data for 21 pressure levels and surface parameters. Multiple forecast times are available for each datetime group.
Possible Problem: If no datetime groups appear under the "COAMPS Run" column, no complete datasets are available in the NOGAPS data directory to run COAMPS.
Solution:
*   Check the cron job of user coamps to confirm the following script is executed by the cron daemon:

    COAMPS_teds_RetrieveGrids.ksh
*   Confirm the Informix and Informix connect software are set up properly.
*   Examine the contents of the log file, /h/data/global/COAMPS/TEDS/log/GridsCron.log.

If the previous steps yield no resolution to the problem, contact NRL for assistance.

2. Examine the NOGAPS grid retrieval log file for unusual entries.

Action: Access the grid retrieval log file from the "Grids from TEDS" link on the Remote Monitor.
Expected Response: Approximately 0 to 12 missing grids are missing for each datetime group.
Possible Problem: The number of missing grids exceeds 12.
Solution:
*   Confirm the Informix and Informix connect software are set up properly.
*   Ensure that NOGAPS data is available in TEDS.
*   Examine the contents of the log file, /h/data/global/COAMPS/TEDS/log/GridsCron.log.

 If the previous steps yield no resolution to the problem, contact NRL for assistance.

Atmospheric Observations

1. Verify the atmospheric observational data has been retrieved from TEDS and written to the COAMPS server.

Action: Log into the COAMPS server and change directories to the observation directory, /h/data/local/COAMPS/obs.
Expected Response: Multiple directories prefixed with the letters "adp" should exist for current datetime groups. The directories should contain files prefixed with "S0A", "SHX", etc.

Possible Problem: The observation directory is empty, or the datetime groups are not current.
Solution:
- Check the cron job for user coamps to confirm the following script is executed by the cron daemon:
  COAMPS_teds_RetrieveObs.ksh
- Confirm the Informix and Informix connect software are set up properly.
- Examine the contents of the log files, /h/data/global/COAMPS/TEDS/log/ObsCron.log and /h/data/global/COAMPS/TEDS/log/Obs.log.

If the previous steps yield no resolution to the problem, contact NRL for assistance.

2. Examine the contents of the observation retrieval log file.

Action: Access the observations log file from the RM by clicking on the "Obs from TEDS" link.
Expected Response: The log file displays multiple reports of "SUCCESS: …. Found."
Possible Problem: The log files displays multiple reports of "WARNING: 0 .. reports/ passes".
Solution:
- Confirm observational data is available from TEDS.
- Confirm the Informix and Informix connect software are set up properly.
- Examine the contents of the log files, /h/data/global/COAMPS/TEDS/log/ObsCron.log and /h/data/global/COAMPS/TEDS/log/Obs.log.

If the previous steps yield no resolution to the problem, contact NRL for assistance.

Oceanographic Observations

1. Confirm the COAMPS Ocean Data Assimilation (CODA) observational files have been retrieved and written to the COAMPS server.

Action: Log into the COAMPS server and check the CODA data directory, /h/data/local/COAMPS/coda, for available files.
Expected Response: The coda directory will contain multiple subdirectories for altim, incoming, mcsst, profile, ship, and ssmi. The subdirectories should contain files for recent datetime groups.
Possible Problem: No recent datetime groups are available or the subdirectories are empty.
Solution:
- Confirm oceanographic observational data is available from TEDS.
- Confirm the Informix and Informix connect software are set up properly.
- Examine the contents of the log files, /h/data/global/COAMPS/TEDS/log/ CodaQCCron.log.
- Confirm the subdirectories have the correct permissions for the COAMPS_USER to read/write.

If the previous steps yield no resolution to the problem, contact NRL for assistance.

C. Data Manager

1. Confirm the data manager is running with each COAMPS forecast.

Action: Log into the COAMPS server. Change to a directory for a current project,

/h/data/global/COAMPS/nodes/coamps/[project name]/log

Look for files of the format, dm[datetime-group].log. Examine the contents of the files.
Expected Response: The files contain lines like "(successful) Ingested into TEDS".
Possible Problem: No dm*.log files exist.
Solution: Contact NRL if the problem persists.

Visualization (IPVS, Vis5D, and IPVS_CHARTS)

COAMPS-OS visualization processing is executed following each COAMPS analysis and forecast. Perform the following Actions to evaluate the perform of the COAMPS-OS visualization software.

IPVS

1. Check for graphical products produced by COAMPS-OS.

Action: Open COAMPS-OS™ visualization page by clicking on "Daily COAMPS-OS™ Forecasts" link on COAMPS-OS™ homepage.
Expected Response: The left frame loads with lists project name with available datetime groups listed below each project name. The right frame loads with a product matrix for the most recent model run.
Possible Problem: Page loads with "No forecast files for operational user COAMPS™ exist" or right frame loads with older model run.
Solution: The user may need to wait until the latest model run and associated visualization processes have completed. If the problem persists, the Remote Monitor may be consulted to confirm the COAMPS analyses and forecasts are completing successfully.

2. Confirm the graphical product matrices are produced following each successful forecast.

Action: View contents of the right-hand frame of the Daily COAMPS-OS™ Forecasts page.
Expected Response: Product matrices for each nest are filled with links (**O**) for all taus and all plots.
Possible Problem: **X** symbols appear for all taus for a given product/plot.
Solution: Confirm that all COAMPS™ fields required for that product are selected in the COAMPS-OS™ GUI.
Possible Problem: **X** symbols appear for all products at a given tau.
Solution: Confirm that all COAMPS™ fields are selected for the desired forecast length.
Possible Problem: **X** symbols appear at regular tau intervals for a given product/plot.
Solution: Verify that all COAMPS™ fields required for that product are selected for the appropriate interval in the COAMPS-OS™ GUI.

3. Verify the two-dimensional plots are produced for graphical products.

Action: Click a link, **O**, to view general two-dimensional plot.
Expected Response: Plot loads in right frame.

4. Verify the Meteogram plots exist.

Action: Scroll to the bottom of the right-hand frame of Daily COAMPS-OS™ Forecasts page below the product matrix.
Expected Response: A meteogram matrix will be filled with links (**O**) for all stations.
Possible Problem: No Meteogram links appear for a given project.

Solution: If no stations have been selected in the Meteogram GUI for a given project, no products will be produced. A user may open the Meteogram GUI from the Applications drop-down menu on the COAMPS-OS™ homepage. The user should select and save stations to be produced with the subsequent COAMPS™ forecasts.

5. Verify Meteogram products are correct.

Action: Open a link to view a Meteogram.
Expected Response: Two Meteogram plots will load side-by-side in the right frame.
Possible Problem: Portions of a Meteogram plot are missing or text message "Entire Grid Undefined" is displayed in center of plot.
Solution: Verify all COAMPS™ fields required for the meteograms are selected in the COAMPS-OS™ GUI. The following list is required as output parameters from COAMPS™:

- Air Temperature (K) – Select multiple pressure levels and height surfaces. The 2-meter level should be included for the height surfaces.
- Geopotential Height (gpm) – Select multiple pressure levels.
- Relative Humidity (%) - Select multiple pressure levels and height surfaces.
- True U and V Velocity Components (m/s) - Select multiple pressure levels and height surfaces. The 10-meter level should be included for the height surfaces.
- Water Vapor Pressure (mb) - Select multiple pressure levels and height surfaces.
- Dewpoint Depression (K) – The 2-meter level should be selected.
- Sea-Level Pressure (mb)
- Cloud Ceiling Height (m)
- Visibility (km)
- Total Cloud Coverage Using Relative Humidity Threshold (%) – The 850mb, 500mb, and 10mb pressure levels are required.
- Bucket Total Precipitation (kg/m^2)
- Modified Refractivity Gradient (1/km)

In general, more pressure or height surface levels will improve vertical resolution in the meteogram plots.

6. Verify the sounding products are available.

Action: View contents of right-hand frame of Daily COAMPS-OS™ Forecasts page.
Expected Response: The sounding matrix will be filled with links (SkewT or Data) for all stations and taus.
Possible Problem: No sounding links appear for a given project.
Solution:
No stations have been selected in the Meteogram GUI for a given project. The user may launch the Meteogram GUI from the Applications drop-down menu on the COAMPS-OS™ homepage and select stations for a project.
Possible Problem: Soundings have been generated for an inappropriate tau interval.

Solution: Soundings are created at the same interval as the "Frequency of Sigma Level Output" parameter in the COAMPS-OS™ GUI. Verify the "Frequency of Sigma Level Output" is set to the desired frequency in the "Forecast" panel.

7. Verify the sounding products are correct.
Action: Click a link labeled as SkewT to view Sounding image.
Expected Response: A plot of a Skew-T will load in right frame.

8. Verify sounding data is correct.

Action: Click a link labeled as Data to view a table of data used to produce the sounding.
Expected Response: A table of vertical levels of pressure, temperature, dewpoint, wind speed, wind direction, absolute humidity, refractivity, and height level will load into right frame. The table is referred to as a datagram.

IPVS_CHARTS

1. Verify the IPVS_CHARTS GUI may be started from the webpage.

Action: From the COAMPS-OS™ homepage, select IPVS_CHARTS from the Applications drop-down menu.
Expected Response: The browser will open a list of requirements for starting IPVS_CHARTS. After the "Launch IPVS_CHARTS" button is selected, the IPVS_CHARTS GUI appears.
Possible Problem: The IPVS_CHARTS GUI does not appear.
Solution:
- An X-server is not available. The user must install an X-server on the workstation.
- An X-server is available but not running. The user must start the X-server.
- An X-server is running, but the X-server does not permit a remote display from the COAMPS™ server to the workstation. The user must configure the X-server to allow the COAMPS™ server to display to the workstation.
- The IP address is listed as, 255.255.255.255. Enter the correct IP address of the local workstation and attempt to launch the GUI again.

2. Verify the IPVS_CHARTS GUI opens with the correct project.

Action: A file selection GUI will appear after IPVS_CHARTS is started. Scroll through the list of available control files. The files have the format of [project].[z-coordinate type].[nest].[datetime group].ctl. Highlight a filename. Preview the contents of the selection in text window beneath the file selection panel. Click on "Select" to accept the file selection, or select "Quit" to terminate the session.
Expected Response: IPVS_CHARTS opens with a 2-D rendering of the selected project.
Potential Problem: IPVS_CHARTS does not appear.
Solution: Contact NRL.

3. Verify the automated creation of a map product from IPVS_CHARTS.

Action: From IPVS_CHARTS, click on the **Automate** menu and select **Add to Web Page**. Accept the proposed name by clicking on OK. Click on the **Automate** menu and select **Update Web Page**. Click on OK to proceed with the update of the webpage.

Expected Response: The processing requires a few minutes to complete. The COAMPS-OS™ Forecasts webpage updates with new images of the product created in IPVS_CHARTS.

Possible Problem: Processing errors may have occurred if the "Finished" message returns in a few seconds.

Solution: Exit IPVS_CHARTS. Click on the File menu and select "Quit". Examine the LAUNCH STATUS link from the web page. If errors are present, the selected project is no longer be available. Select a different project.

4. Confirm the creation of the automated products.

Action: From the COAMPS-OS™ homepage, select Daily COAMPS-OS™ Forecasts. Scroll to the bottom of the table for the selected nest. Locate and select an image from the automated product list.

Expected Results: A table entry for MSL Sea Level Pressure should be present.

Possible Problem: The automated product is bad, blank, or missing, or a processing error has occurred.

Solution: Report the problem to NRL.

5. Verify the IPVS_CHARTS functionality to automatically produce cross-section and profile products.

Action: Launch the IPVS_CHARTS GUI and select "slpr" to turn sea level pressure off. Click on "t" to display a 2-D plot of temperature.

Create a cross-section product using the following steps:
   a) Click on the Mode menu and select Sections.
   b) Click on the Path button and wait for a re-draw.
   c) Click at two widely spaced points inside the displayed temperature field.
   d) Click on the Section button and then the Draw button.
   e) When the section is drawn, click the Automate menu and select Add to Web Page.
   f) Accept the proposed name by clicking on OK.

Create a profile product using the following steps:
   a) Click on the Mode menu and select Profiles.
   b) Click on the Point button and wait for a re-draw.
   c) Click at two widely spaced points inside the displayed temperature field.
   d) Click on the Profile button and then the Draw button.
   e) When the section is drawn, click the Automate menu and select Add to Web Page.
   f) Accept the proposed name by clicking on OK.

After creating the cross-section and profile products, perform the following steps:
   a) Exit IPVS_CHARTS.
   b) Click on the File menu and select Quit.
   c) Access the product from the COAMPS-OS™ Forecasts page.

Possible Problem: The products are not generated, or the webpage did not update with new products.

Solution: Document the steps used to create the cross-sections and profiles. Save the log files associated with IPVS_CHARTS and notify NRL of the problem.

6. Verify IPVS_CHARTS ability to print an image.

Action: Launch IPVS_CHARTS. Click on the File menu and select Print. Note the announced printer destination. Click OK.
Expected Results: The desired output is printed.
Possible Problem: No output is printed.
Solution: Confirm the printer is working properly. Confirm the lpd (print daemon) is enabled on the COAMPS server. The COAMPS server must have a printer available to print a product.
Possible Problem: If a printer is available and working, and IPVS_CHARTS is unable to print the product, a software error may have occurred or the image output is bad. Notify NRL of the problem and note any error messages produced by the system or the GUI. Save IPVS_CHARTS log files associated with the session.

7. Verify IPVS_CHARTS ability to save and view individual images.

Action: Click on the File menu and select Save Image. Click on the File menu and select View Image.
Expected Results: Netscape will launch with a list of saved images.
Possible Problem: Netscape does not appear.
Solution: Exit IPVS_CHARTS. Click on LAUNCH STATUS. Review and correct local problems to access Netscape. If unsuccessful, notify NRL and send LAUNCH STATUS.
Possible Problem: Bad image.
Solution: Send the bad image to NRL using the Netscape send capability.

8. Test the help capabilities of IPVS_CHARTS.

Action: Click on the Help button and select Overview.
Expected Results: Netscape will launch with a Help document for IPVS_CHARTS.
Possible Problem: Netscape does not appear.
Solution: Exit IPVS_CHARTS. Click on LAUNCH STATUS. Review and correct local problems to access Netscape. If unsuccessful, notify NRL and send LAUNCH STATUS.
Possible Problem: The document does not appear.
Solution: The Acrobat PDF Reader must be installed on the COAMPS server.

D. Remote Monitor

1. Access the Remote Monitor.

Action: From the COAMPS™ homepage, move the mouse over COAMPS-OS™ System Monitor hyplerlink and click.
Expected Results: The COAMPS™ Remote Monitor GUI should display.
Possible Problem: All the reports show as purple **NO_RPT**.
Solution 1:   The RM may report **NO_RPT** immediately following the installation of the software. The pages should update within five to ten minutes after all the status reports have been sent and parsed.
Solution 2: If the **NO_RPT** status persists after waiting five to ten minutes, look at each item on a case by case basis.   For each item showing **NO_RPT**, click on the **NO_RPT** hyperlink to access the **Display Report** page.
Solution 3:   If a report exists and the status is reported as **NO_RPT**, COWEB_PARSE_ALL_REPORTS.pm may not be running. The script is called from the cron on the webserver. Examine the cron entries using the following steps:

> 1) cd /MONITOR/bin
> 2) crontab –l

If step (2) produces no output, the RM processes have not been added to the cron table for user coweb. The cron is normally enabled during the installation of the COWEB segment. Start the cron job for user coweb by performing the following steps:

> 1) cd /MONITOR/install
> 2) ./COWEB_postinstall_monitor.sh

Solution 4: Manually run an RM cron entry from the command line. Perform the following steps to run an RM command from the command line on the COAMPS-OS^{TM} webserver:

1) Login as user coweb on the webserver
2) Type "crontab -l" to ensure the command listed in step 2 is included with in the cron table
3) Run the following command:
/h/data/global/COWEB/pub/cgi-bin/RM/bin/COWEB_run_perl.sh
/h/data/global/COWEB/pub/cgi-bin/RM/bin/COWEB_PARSE_ALL_REPORTS.pl

After the command from (2) has terminated, note any error messages and examine the Remote Monitor display in a web browser. If a status previously reported as NO_RPT has a new status in the RM display, the cron daemon may not be running. Contact the system administrator to check whether the cron daemon is enabled. If reports are available in subdirectories listed under the status reports directory,

/h/data/global/COWEB/pub/cgi-bin/RM/data/status_reports

after manually running COWEB_PARSE_ALL_REPORTS.pl, and the status still shows **NO_RPT**, the RM software may have a problem. The incident should be reported to NRL.

2.   Check with the RM reports are written.

Action: Confirm the RM processes are writing reports.
Possible Problem: The RM reports are missing.
Solution: Most Remote Monitor reports consist of status files written by processes running on different servers and emailing reports to the webserver. Other RM reports (e.g. COAMPS™ log files) are displayed from the location where the files are written. Therefore, missing reports may result from an inability to send/receive email, or a process has failed to create a log file.

3.   Examine the status reports of the RM.

Action: Open the Remote Monitor in a web browser.
Possible Problem: Several status reports are flagged as **LATE**.
Solution 1: If the Forecast or Nowcast links are reported as LATE, code associated with execution of the COAMPS^{TM} model may not be creating log files. The problem may be caused if the COAMPS^{TM} model fails to properly terminate.
Solution 2: All log files have been written, but the reports are late. To determine the reasons for the late reports, examine the contents of the subdirectories listed in the directory,

/h/data/global/COWEB/pub/cgi-bin/RM/data/status_reports

The status reports are sent by the RM processes on the COAMPS server and webserver. A late report may indicate problems with the cron table or cron daemon on the COAMPS server or webserver. To confirm whether the cron processing is functioning properly on the COAMPS server, manually run one of the following scripts as user coamps:

- /d/COAMPS/bin/COAMPS_rm/bin/COAMPS_run_perl.sh
  /d/COAMPS/bin/COAMPS_rm/bin/COAMPS_reports_on_self.pl
- /d/COAMPS/bin/COAMPS_rm/bin/COAMPS_run_perl.sh
  /d/COAMPS/bin/COAMPS_rm/bin/COAMPS_reports_on_others.pl

To confirm whether the cron processing is functioning properly on the webserver, manually run one of the following scripts as user coweb:

- /h/data/global/COWEB/pub/cgi-bin/RM/bin/COWEB_run_perl.sh
  /h/data/global/COWEB/pub/cgi-bin/RM/bin/COWEB_webserver_reports_on_self.pl
- /h/data/global/COWEB/pub/cgi-bin/RM/bin/COWEB_run_perl.sh
  /h/data/global/COWEB/pub/cgi-bin/RM/bin/COWEB_webserver_reports_on_others.pl

Following the completion of the commands above, run the following command on the webserver:

- /h/data/global/COWEB/pub/cgi-bin/RM/bin/COWEB_run_perl.sh
  /h/data/global/COWEB/pub/cgi-bin/RM/bin/COWEB_PARSE_ALL_REPORTS.pl

If the RM display updates with new status reports after manually executing the RM processes above from the command line, the cron daemon may be not be enabled. If the RM display does not update with new status reports after manually executing the RM processes above from the command line, confirm whether the status reports were received by the webserver. The reports should be written to the subdirectories of,

/h/data/global/COWEB/pub/cgi-bin/RM/data/status_reports.

If the reports are not current or missing, a problem may exist with the RM code that sends and receives the status reports. Contact NRL to report the incident. By default, a report is labeled as LATE if the report fails to update within 60 minutes. If the status reports are found to be current, the RM code may have problems parsing the status reports. Contact NRL to report the incident.

4. Verify the email notification of the RM works properly.

Action: Review recent emails sent to the COAMPS administrator, COAMPS_ADMIN, listed in the file, /h/data/global/COAMPS/COAMPS_config.sh.
Possible Problem: The administrator has received no email notifications from the coamps user on the COAMPS server or from the coweb user on the webserver.
Solution: From the Remote Monitor main page, click the **Edit Config** button at the top of the page. Confirm the variables listed in the **Edit Config** page are set to the following:

EMAIL_NOTIFICATION	Yes
NOTIFY_OF_MONITOR_ERRORS	Valid email addresses have been set
NOTIFY_OF_DATABASE_CHANGES	Valid email addresses have been set
NOTIFY_OF_COAMPS_CHANGES	Valid email addresses have been set
DATABASEPAGE	Yes
COAMPSPAGE	Yes
MACHINEPAGE	Yes

If the values listed in the Edit Config file resemble the values listed in the table, check the sendmail daemon for possible problems. Confirm the sendmail daemon is running on both the COAMPS server and webserver. If the daemon is running, try sending email to a valid email address as user coamps on the COAMPS server or user coweb on the webserver. If the email fails to reach the desired destination, consult with the system administrator for possible configuration problems with sendmail.

5. Check send and receive routines.

Action: Confirm the proper execution of the RM send and receive routines.
Possible Problem: The send and receive scripts do not function properly.
Solution: Reports are sent from the COAMPS server and webserver to the webserver using the scripts,

/h/data/global/COWEB/pub/cgi-bin/RM/bin/COWEB_post_file.pl
/h/COAMPS/bin/COAMPS_rm/bin/COAMPS_post_file.pl

The reports are received by the http daemon of the webserver and processed by the following cgi script on the webserver,

/h/data/global/COWEB/pub/cgi-bin/RM/cgi-bin/COWEB_receive_post.cgi

To determine possible errors with the send/receive scripts of the RM, perform the following steps:

- Use the tail command to interactively view the most recent contents of the http log file
- Execute the following command on the COAMPS server:
    o /d/COAMPS/bin/COAMPS_rm/bin/COAMPS_run_perl.sh
      /d/COAMPS/bin/COAMPS_rm/bin/COAMPS_reports_on_others.pl

Errors with the receiver component of the RM code will appear in the log file as the command is executed.

6. Check the status reports for the COAMPS server.

Action: Open the Remote Monitor in a web browser.
Possible Problem: The status of the COAMPS server is reported as **LATE** or **NO_RPT**.
Solution: Click on the COAMPS server status hyperlink. Note the process indicating the **LATE** or **NO_RPT** status report. Log into the COAMPS server as user coamps and manually run the following command,

- /d/COAMPS/bin/COAMPS_rm/bin/COAMPS_run_perl.sh
  /d/COAMPS/bin/COAMPS_rm/bin/COAMPS_reports_on_self.pl

Note any errors produced by the command. If errors do occur, contact NRL. Log into the webserver as user coweb and run the following command,

- /h/data/global/COWEB/pub/cgi-bin/RM/bin/COWEB_run_perl.sh
  /h/data/global/COWEB/pub/cgi-bin/RM/bin/COWEB_PARSE_ALL_REPORTS.pl

Note any errors produced by the command. If errors do occur, contact NRL.

7.   Check webserver machine status reports.

Action: Open the Remote Monitor in a web browser.
Possible Problem: The webserver machine status is reported as **LATE** or **NO_RPT**.
Solution: Click on the webserver server status hyperlink. Note the process indicating the **LATE** or **NO_RPT** status report. Perform step (3) to review the status reports of the webserver.

4.1.1.7 Assumptions and Constraints

This test requires that the: 1) installation procedures are followed completely, 2) COWEB segment of the COAMPS-OS™ system be properly installed and configured, and 3) provided sample set of data be used as input to the COAMPS™ forecast.

5. Requirements Traceability

The requirements tested by these procedures are those specified in Section 3 of the Software Requirements Specification for the COAMPS-OS™ system.

6. Notes

6.1 GLOSSARY

COAMPS™	Coupled Ocean/Atmosphere Mesoscale Prediction System
COAMPS-OS™	COAMPS™ - On Scene
COE	Common Operating Environment
Datagram	ASCII file containing data for the Skew-T/Forecast Sounding.
GCCS-M	Global Command and Control System - Maritime
GUI	Graphical User Interface
IPVS	Integrated Portable Visualization System: The visualization component of COAMPS-OS™ that produces images viewable from the World Wide Web.
Meteogram	A graphical representation of the meteorological state of the atmosphere over time at a single geographical point.
NFS	Network File System
NOGAPS	Navy Operational Global Atmospheric Prediction System
NWP	Numerical Weather Prediction
RM	Remote Monitor: The RM provides a means for monitoring COAMPS-OS™ via the World Wide Web. The RM displays the status of various system processes and sends email notifications when problems are detected.
SPAWAR	Space and Naval Warfare Systems Command
STD	Software Test Document
Tau	A forecast hour.
TEDS	Tactical Environmental Database Server
Time Step Plot	Run time statistics displayed by the RM, showing the current and average times to process a single tau and the total time to complete the run.

April 15, 2002

Appendix A—Forecast Sounding Datagrams

```
COAMPS™ Forecast Sounding for 1999083112 +000 h
Data for gridpoint nearest to CAPE HATTERAS
KHAT  Lat: 35.27 Lon: -75.50 Nest 3
COAMPS™ Model Surface Elevation: 0.00 ft
```

Pres/mb	Temp/C	Dewp/C	Spd/kt	Dir/Deg	AH/g/m3	Refr/MUnit	W/cm/s	Hght/ft
10.39	-44.62	-73.29	22.74	95.09	0.00	15997.92	1.54	101875.05
28.67	-54.30	-80.49	21.51	67.98	0.00	12579.02	-0.93	80056.40
63.94	-65.10	-83.31	13.78	84.10	0.00	10017.12	1.40	63651.40
112.02	-71.26	-83.58	21.00	246.02	0.00	8310.69	-2.09	52660.05
149.24	-61.41	-77.88	28.77	225.46	0.00	7420.87	-11.84	46918.30
175.02	-56.02	-67.27	27.45	227.07	0.00	6913.64	-7.37	43637.30
200.33	-48.73	-64.81	27.08	250.06	0.01	6469.64	1.26	40766.43
224.19	-42.13	-62.49	28.53	251.79	0.01	6089.35	6.70	38305.68
250.17	-36.27	-59.26	26.04	248.51	0.01	5709.69	6.87	35844.93
278.42	-31.15	-57.69	26.60	247.77	0.01	5330.69	5.30	33384.18
309.12	-25.26	-52.53	25.48	258.66	0.03	4951.92	2.44	30923.43
342.44	-20.63	-90.00	22.16	272.49	0.00	4573.87	-1.10	28462.68
385.12	-17.42	-18.23	11.03	34.20	1.15	4142.49	-2.61	25591.80
439.35	-11.01	-16.02	8.67	347.82	1.37	3641.84	-7.28	22310.80
499.97	-7.58	-11.46	11.52	335.47	2.02	3146.86	-5.90	19029.80
555.62	-3.35	-2.16	16.74	341.69	4.18	2659.07	-0.44	15748.80
634.93	2.31	2.31	28.34	356.03	5.68	2223.33	2.69	12795.90
700.34	6.61	6.62	39.93	9.97	7.56	1837.65	6.60	10171.10
771.43	9.58	9.58	42.04	16.39	9.15	1452.23	5.09	7546.30
838.56	13.81	12.49	43.94	11.96	10.94	1116.60	3.53	5249.60
889.48	15.73	13.70	47.35	4.30	11.75	875.66	3.75	3609.10
926.75	16.56	15.20	51.14	353.25	12.92	711.39	2.64	2460.75
954.14	18.86	16.82	50.18	353.94	14.22	594.98	1.38	1640.50
973.08	20.92	17.51	49.59	354.87	14.74	513.14	0.92	1082.73
986.02	22.33	18.00	49.06	355.53	15.13	457.91	0.70	705.42
994.52	23.25	18.34	48.44	355.94	15.41	422.06	0.52	459.34
1000.16	23.88	18.61	47.75	356.21	15.64	398.37	0.40	295.29
1004.16	24.27	18.81	46.84	356.11	15.82	381.94	0.31	180.46
1007.07	24.58	19.05	45.57	356.00	16.04	370.72	0.23	98.43
1009.36	24.91	19.43	43.10	355.86	16.41	362.76	0.10	32.81

April 15, 2002

```
COAMPS™ Forecast Sounding for 1999083112 +000 h
Data for gridpoint nearest to CHARLESTON (NISE)
KNEX  Lat: 32.94 Lon: -79.93 Nest 3
COAMPS™ Model Surface Elevation: 17.54 ft
Pres/mb  Temp/C  Dewp/C  Spd/kt Dir/Deg AH/g/m3 Refr/MUnit  W/cm/s    Hght/ft
  10.43  -43.71  -70.71   31.21   80.61    0.00  15998.22    -0.04  101876.94
  28.63  -53.33  -79.01   22.99   87.77    0.00  12579.79    -1.47   80061.64
  63.72  -64.78  -81.75   19.78   75.63    0.00  10018.22    -0.42   63659.16
 112.15  -74.35  -80.62   19.31  202.67    0.00   8312.89     0.94   52669.50
 149.43  -60.41  -90.00   20.75  201.69    0.00   7422.30    -0.93   46928.63
 175.11  -55.00  -75.39   17.74  226.66    0.00   6915.06    -1.52   43648.14
 200.41  -49.10  -63.63   26.69  250.11    0.01   6471.56    -1.63   40777.70
 224.35  -43.31  -50.31   38.30  250.34    0.04   6091.84    -1.88   38317.33
 250.49  -37.72  -58.53   43.14  260.53    0.01   5712.19    -3.01   35856.96
 278.96  -32.61  -47.85   39.17  271.97    0.05   5333.59    -3.92   33396.59
 309.93  -26.98  -49.62   38.64  269.00    0.04   4954.94    -3.19   30936.21
 343.62  -22.94  -50.67   37.65  267.74    0.03   4577.50    -2.43   28475.84
 386.76  -17.89  -42.25   34.67  274.01    0.08   4138.19    -1.59   25605.41
 441.46  -11.93  -44.04   30.03  282.18    0.07   3636.60    -0.46   22324.91
 502.56   -7.11  -84.78   23.44  309.00    0.00   3136.57    -1.04   19044.42
 570.86   -2.70  -28.57   15.25  327.66    0.39   2641.19    -2.52   15763.92
 638.97    2.09  -16.77   12.32  355.43    1.22   2199.17    -1.63   12811.47
 705.05    6.89   -8.74   11.93   11.10    2.40   1809.52    -0.20   10187.08
 776.57   12.09   -4.79   10.81  352.06    3.24   1418.15     0.48    7562.68
 843.96   15.53   -2.87   10.52  331.15    3.71   1075.79     0.20    5266.33
 895.34   15.13    6.24   10.63  347.18    7.15    853.01    -0.42    3626.08
 933.07   15.85    8.23    8.79   31.76    8.17    688.24    -0.11    2477.91
 960.85   17.05   11.43   20.43   60.78   10.08    577.04    -0.01    1657.79
 980.17   16.05    9.61   27.46   43.92    8.96    489.11    -0.21    1100.10
 993.57   15.80    8.92   23.17   27.91    8.56    431.35    -0.30     722.84
1002.38   15.69    8.85   18.60   18.51    8.52    394.98    -0.31     476.81
1008.30   15.53    8.87   15.04   11.94    8.54    371.10    -0.25     312.78
1012.47   15.31    8.94   11.70    5.51    8.58    354.70    -0.16     197.97
1015.46   15.17    9.02    9.03    1.02    8.63    343.10    -0.10     115.95
1017.86   14.94    9.12    5.71  353.90    8.70    334.12    -0.07      50.34
```

```
COAMPS™ Forecast Sounding for 1999083112 +000 h
Data for gridpoint nearest to RALEIGH-DURHAM
KRDU  Lat: 35.88 Lon: -78.76 Nest 3
COAMPS™ Model Surface Elevation: 414.84 ft
Pres/mb  Temp/C  Dewp/C  Spd/kt Dir/Deg AH/g/m3 Refr/MUnit  W/cm/s    Hght/ft
  10.37  -45.45  -72.63   20.58   73.93    0.00  16004.95    0.16  101919.75
  28.57  -54.21  -79.30   20.75   70.68    0.00  12598.45   -0.18   80180.37
  63.42  -64.33  -83.38   13.55   77.03    0.00  10045.66   -0.77   63834.98
 110.67  -70.59  -81.71   11.18  245.11    0.00   8345.12    1.49   52883.56
 147.00  -59.77  -82.25   29.84  236.19    0.00   7458.00    2.73   47162.67
 172.15  -55.39  -70.74   39.56  244.51    0.00   6952.66    1.20   43893.59
 196.86  -47.82  -69.65   44.39  250.36    0.00   6510.02    0.18   41033.15
 220.23  -43.55  -63.80   42.92  251.70    0.01   6131.75    0.81   38581.34
 245.77  -37.06  -65.05   35.26  253.20    0.00   5753.15    1.86   36129.53
 273.62  -33.30  -61.98   31.89  250.52    0.01   5375.98    1.28   33677.72
 304.07  -29.12  -58.50   22.60  248.08    0.01   4999.24    0.02   31225.91
 337.32  -25.30  -54.31    9.99  230.39    0.02   4623.29   -0.72   28774.10
 380.05  -22.03  -40.56   10.54  112.07    0.10   4186.60   -0.13   25913.66
 434.49  -16.15  -17.94   22.50   61.71    1.17   3694.23    0.31   22644.58
 495.42  -11.97  -21.95   37.22   57.37    0.79   3194.33    1.62   19375.50
 563.16   -3.47  -17.55   31.67   45.69    1.16   2698.14    0.70   16106.42
 630.09    2.39  -11.60   22.74   24.78    1.92   2256.26   -1.42   13164.25
 694.96    6.85  -10.83   15.64   19.27    2.02   1861.22   -1.35   10548.98
 765.15   12.41   -5.16   14.10   16.58    3.14   1472.46   -1.48    7933.72
 831.48   14.20  -24.82   17.37   13.19    0.54   1114.08   -0.63    5645.36
 882.26   13.11    1.55    7.15   23.75    5.17    899.99   -0.47    4010.82
 919.62   13.17    6.69   21.71   38.69    7.42    743.95   -1.03    2866.65
 947.20   14.15    8.17   32.45   32.26    8.18    626.64   -0.48    2049.38
 966.38   14.10    7.83   36.01   20.36    8.00    543.52    0.12    1493.63
 979.60   13.49    7.95   28.75    5.30    8.08    489.22    0.43    1117.69
 988.33   13.48    8.24   22.85  355.92    8.24    454.08    0.55     872.51
 994.19   13.58    8.47   18.63  349.43    8.37    430.68    0.61     709.05
 998.31   13.68    8.65   15.48  344.63    8.47    414.29    0.61     594.64
1001.26   13.74    8.76   13.01  340.00    8.53    402.59    0.59     512.91
1003.63   13.72    8.88   10.18  333.58    8.60    393.37    0.67     447.53
```

```
COAMPS™ Forecast Sounding for 1999083112 +012 h
Data for gridpoint nearest to CAPE HATTERAS
KHAT  Lat: 35.27 Lon: -75.50 Nest 3
COAMPS™ Model Surface Elevation: 0.00 ft
Pres/mb  Temp/C  Dewp/C  Spd/kt Dir/Deg AH/g/m3 Refr/MUnit   W/cm/s    Hght/ft
  10.49  -41.01  -74.78   17.04   88.42    0.00  15997.90     0.89  101875.05
  28.73  -54.29  -82.88   23.64   79.66    0.00  12579.04    -0.34   80056.40
  64.02  -64.65  -86.02   14.22  126.40    0.00  10017.10    -0.72   63651.40
 112.32  -72.29  -81.40   19.25  294.76    0.00   8311.02     1.72   52660.05
 149.53  -60.34  -84.33   35.81  218.21    0.00   7420.70     3.04   46918.30
 175.26  -55.60  -69.84   44.47  238.54    0.00   6913.59     2.92   43637.30
 200.62  -49.23  -63.06   38.92  243.11    0.01   6469.91    -0.65   40766.43
 224.54  -42.17  -66.37   39.68  246.53    0.00   6089.46     1.87   38305.68
 250.57  -36.47  -60.77   36.51  239.49    0.01   5709.87     7.56   35844.93
 278.92  -31.78  -54.64   36.80  248.88    0.02   5331.13     4.03   33384.18
 309.83  -27.00  -90.00   31.66  269.89    0.00   4952.66    -6.80   30923.43
 343.40  -21.13  -70.51   19.33  270.07    0.00   4574.39   -12.04   28462.68
 386.26  -17.47  -19.52    9.14  247.27    1.02   4141.98   -11.67   25591.80
 440.62  -10.72  -12.05   15.74  259.41    1.94   3645.82   -10.77   22310.80
 500.99   -4.78   -5.72   19.48  282.45    3.20   3153.08    -5.83   19029.80
 568.09    0.20   -0.62   20.07   13.09    4.63   2663.02   -21.16   15748.80
 634.87    4.70    4.72   29.41   22.37    6.67   2227.61   -29.00   12795.90
 699.64    8.82    8.84   35.98   21.81    8.72   1842.69    -2.55   10171.10
 769.95   12.51   12.52   46.35   19.25   11.01   1460.31    28.75    7546.30
 836.44   15.26   15.27   56.33   11.42   13.03   1127.08    48.54    5249.60
 886.97   17.20   17.20   58.50    1.37   14.64    890.57    52.39    3609.10
 923.91   18.57   18.57   55.36  358.61   15.89    725.95    45.91    2460.75
 951.09   19.45   19.46   52.33  354.84   16.74    608.35    33.78    1640.50
 969.97   20.16   20.07   49.78  348.03   17.34    528.47    22.12    1082.73
 982.93   20.98   20.50   46.16  345.03   17.77    474.15    13.25     705.42
 991.44   21.66   20.80   44.27  343.71   18.05    438.57     8.28     459.34
 997.14   22.14   21.00   43.04  343.05   18.24    414.81     6.29     295.29
1001.14   22.50   21.16   41.83  342.58   18.40    398.33     4.92     180.46
1004.01   22.79   21.33   40.26  342.19   18.58    386.89     3.74      98.43
1006.31   23.10   21.61   37.39  341.77   18.88    378.53     1.59      32.81
```

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```
COAMPS™ Forecast Sounding for 1999083112 +012 h
Data for gridpoint nearest to CHARLESTON (NISE)
KNEX  Lat: 32.94 Lon: -79.93 Nest 3
COAMPS™ Model Surface Elevation: 17.54 ft
Pres/mb  Temp/C  Dewp/C  Spd/kt Dir/Deg AH/g/m3 Refr/MUnit  W/cm/s   Hght/ft
  10.44  -41.34  -74.21   22.11   93.68    0.00   15998.19   -2.12  101876.94
  28.64  -54.77  -80.22   26.25   87.90    0.00   12579.86    1.50   80061.64
  63.80  -64.18  -84.00   10.32  101.59    0.00   10018.18    0.16   63659.16
 111.91  -72.48  -82.51   13.25  156.16    0.00    8312.39   -0.18   52669.50
 149.47  -63.54  -72.73   30.10  234.03    0.00    7423.14    7.44   46928.63
 175.52  -57.56  -69.73   22.38  244.03    0.00    6915.96    6.95   43648.14
 201.11  -50.51  -62.62   31.76  265.14    0.01    6472.25    2.45   40777.70
 225.27  -44.09  -50.35   39.96  271.15    0.04    6092.41   -2.88   38317.33
 251.62  -38.62  -41.59   46.49  269.64    0.10    5713.52   -5.93   35856.96
 280.31  -33.20  -46.95   45.58  270.83    0.05    5334.28   -7.17   33396.59
 311.50  -27.58  -49.14   41.04  269.59    0.04    4955.69   -6.55   30936.21
 345.39  -22.61  -54.76   36.90  271.96    0.02    4577.81   -5.87   28475.84
 388.62  -16.84  -51.59   35.61  280.82    0.03    4137.89   -5.76   25605.41
 443.27  -10.49  -23.43   23.64  283.41    0.68    3640.40   -5.45   22324.91
 504.37   -7.30  -16.78   17.06  350.98    1.26    3145.36   -6.66   19044.42
 572.72   -2.21  -10.52   12.14  357.38    2.14    2652.58   -2.67   15763.92
 640.45    4.94  -11.74    8.95    6.78    1.88    2201.78   -0.24   12811.47
 706.01    8.77  -11.53   14.16  357.56    1.89    1805.25   -1.53   10187.08
 776.94   15.04   -8.43   12.38  330.72    2.40    1410.87    1.73    7562.68
 843.58   19.27  -39.61   18.86   17.00    0.10    1051.27    2.21    5266.33
 894.70   15.06    6.51   18.45  357.11    7.28     853.74   -0.12    3626.08
 932.28   16.88   12.78   16.05  350.85   11.03     703.98   -1.12    2477.91
 959.85   19.27   13.60   15.47  350.65   11.54     582.96   -1.16    1657.79
 978.92   20.91   14.07   14.93  350.66   11.83     500.32   -0.98    1100.10
 991.98   22.01   14.49   13.87  350.32   12.11     444.97   -0.78     722.84
1000.56   22.68   14.92   12.10  349.56   12.42     409.65   -0.57     476.81
1006.31   23.10   15.27   10.29  348.75   12.69     386.50   -0.38     312.78
1010.35   23.37   15.55    8.62  348.00   12.91     370.50   -0.24     197.97
1013.24   23.54   15.78    7.08  347.35   13.09     359.24   -0.15     115.95
1015.56   23.62   16.06    4.97  346.49   13.32     350.79   -0.08      50.34
```

```
COAMPS™ Forecast Sounding for 1999083112 +012 h
Data for gridpoint nearest to RALEIGH-DURHAM
KRDU  Lat: 35.88 Lon: -78.76 Nest 3
COAMPS™ Model Surface Elevation: 414.84 ft
Pres/mb  Temp/C  Dewp/C  Spd/kt Dir/Deg AH/g/m3 Refr/MUnit   W/cm/s    Hght/ft
  10.48  -41.78  -73.60   16.74   90.67    0.00  16004.93    -0.53  101919.75
  28.61  -54.11  -79.82   20.06   87.08    0.00  12598.46     1.11   80180.37
  63.44  -63.74  -83.23   21.61  107.31    0.00  10045.60     0.95   63834.98
 110.63  -70.53  -81.05   18.47  243.89    0.00   8345.09    -9.79   52883.56
 147.26  -61.92  -81.61   37.33  251.37    0.00   7458.64   -16.13   47162.67
 172.61  -55.77  -74.00   36.94  246.10    0.00   6952.92    -7.47   43893.59
 197.44  -48.36  -74.01   31.38  239.02    0.00   6510.37     5.86   41033.15
 220.97  -44.60  -64.20   31.62  253.85    0.01   6132.34    16.37   38581.34
 246.68  -37.28  -67.42   28.27  276.85    0.00   5753.52    14.09   36129.53
 274.67  -33.81  -61.29   17.64  272.46    0.01   5376.52     7.25   33677.72
 305.25  -28.72  -90.00    6.12  286.13    0.00   4999.37     4.33   31225.91
 338.58  -24.92  -46.22    5.14   75.67    0.05   4623.75     2.50   28774.10
 381.37  -21.41  -20.95   21.52   44.35    0.90   4192.15     5.92   25913.66
 435.63  -13.81  -13.99   20.89   38.99    1.66   3696.56     6.79   22644.58
 495.96   -8.45   -8.55   24.46   35.17    2.58   3204.16     2.22   19375.50
 563.12   -3.04   -3.17   29.66   34.56    3.87   2715.18    -4.78   16106.42
 630.26   -0.61   -4.74   45.32    1.20    3.40   2267.74   -25.81   13164.25
 695.60    4.72    0.85   44.63   26.26    5.07   1881.86   -43.21   10548.98
 766.12   10.94    4.25   54.37   31.68    6.31   1493.14   -31.29    7933.72
 832.22   15.95    8.14   54.08   33.46    8.11   1158.05    -4.60    5645.36
 882.80   12.94    5.27   35.35   28.22    6.73    909.70     3.00    4010.82
 920.00   15.89    7.05   26.60    8.01    7.53    741.95    -1.37    2866.65
 947.26   18.31    7.82   25.04    6.60    7.88    620.50     1.09    2049.38
 966.10   19.95    8.41   23.66    6.09    8.16    538.22     2.15    1493.63
 979.01   20.97    9.18   21.06    5.51    8.56    483.91     2.33    1117.69
 987.50   21.55    9.81   18.09    4.97    8.91    449.09     1.98     872.51
 993.19   21.88   10.28   15.39    4.52    9.19    426.19     1.60     709.05
 997.19   22.06   10.64   12.98    4.17    9.41    410.38     1.30     594.64
1000.05   22.15   10.95   10.70    3.92    9.60    399.30     1.08     512.91
1002.34   22.14   11.28    7.79    3.69    9.81    390.91     0.87     447.53
```

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Appendix B—Test Worksheets

These worksheets are provided for reference during the test procedure.

Fill in the product tables with the actual values output by the running the test procedure. Use the values to compare with the expected values listed in Tables 4-2 and 4-3 for evaluating the test results.

Product	Nest	Total Observations	Rejected Observations
Aircraft Reports (acar)	1		
Aircraft Reports (acar)	2		
Aircraft Reports (acar)	3		
Upper Air (raob)	1		
Upper Air (raob)	2		
Upper Air (raob)	3		

Product (units)	Nest	Maximum	Minimum	Mean
Terrain Height (feet)	1			
Terrain Height (feet)	2			
Terrain Height (feet)	3			
Ground Wetness (0-1)	1			
Ground Wetness (0-1)	2			
Ground Wetness (0-1)	3			
Sea Level Pressure (mb)	1			
Sea Level Pressure (mb)	2			
Sea Level Pressure (mb)	3			

Enter a check in the **Completed** column after performing each test.

Module Tests	Completed
COAMPS-OS™ GUI	
Check the initial appearance of the Map Panel	
Check for example projects	
Check for available output fields	
Check for available datetime groups	
Confirm initial values for directory locations	
Test add, edit, and remove batch queue	
Confirm project is read properly	
Confirm zoom functionality	
Data Retrieval	
Verify gridded data files have been retrieved	
Verify grid log file	
Verify observations data has been retrieved	
Verify observations log file	
Verify CODA data files have been retrieved	

Verify COAMPS™ data has been retrieved	
Data Manager	
Visualization	
Verify main view of IPVS web page	
Verify visualization products exist	
Verify two-dimensional plot	
Verify Meteogram products exist	
Verify Meteogram products are correct	
Verify sounding products exist	
Verify sounding products are correct	
Verify sounding data is correct	
Verify IPVS_CHARTS initiates	
Verify IPVS_CHARTS project selection	
Verify IPVS_CHARTS automating a map product	
Verify an IPVS_CHARTS automated product	
Verify IPVS_CHARTS automating a section and a profile product	
Test IPVS_CHARTS printing a product	
Test IPVS_CHARTS saving and viewing an image	
Test IPVS_CHARTS help	
Remote Monitor	
Access the Remote Monitor	
Check that reports are written	
Check that report statuses are reported properly	
Check that email notification works properly	
Check send and receive routines work properly	
Check computational machine status reports	
Check webserver machine status reports	